OCT 26 1943
FLAX MILLING

ELECTRICAL REVIEW

FOUNDED 1872

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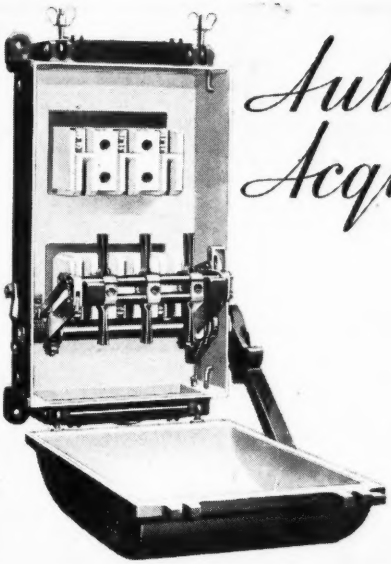

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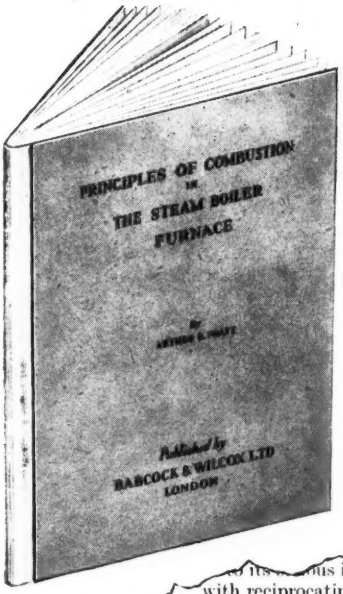

IN order to meet the many enquiries received from Government Departments and others interested in fuel economy, we have fortunately been able to reprint a small supply of this book. Owing to the need for the strictest economy in the use of paper, its appearance is austere to match the times—it is in "battledress." But the contents are the same as in the 1936 edition, which caused "Engineering" to write as follows in the issue of November 27th, 1942.—

... its ... inaccuracy when used in connection with reciprocating feed-pumps.

As regards all calculations relating to combustion matters, flue-gas composition, etc., it may be suggested that, since the publication by Messrs. Babcock and Wilcox of A. D. Pratt's masterly handbook on *The Principles of Combustion in the Steam Boiler Furnace*, there has been really nothing left for subsequent writers to add to the subject. The present authors, however, introduce a variation ... their ... on the ...

heat in th the con em fro

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Please send me a copy of "Principles of Combustion." I do not possess a copy of the 1936 edition.

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ELECTRICAL REVIEW

October 1, 1943

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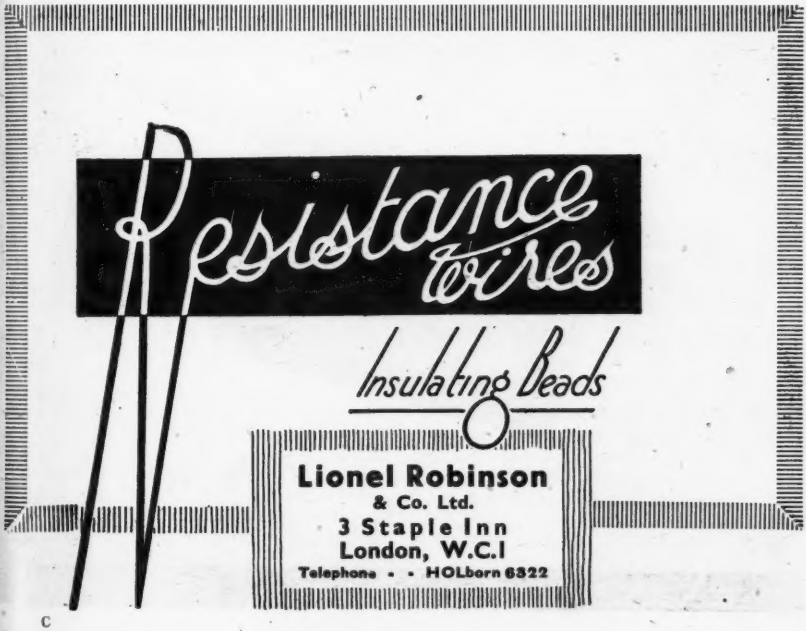

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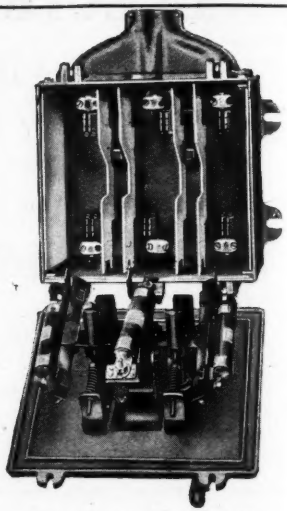

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ELECTRICAL REVIEW
THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIII. No. 3436. OCTOBER 1, 1943 6d. WEEKLY

Electrons and Engineers

Far-Reaching Possibilities

POWER engineers have been well content that electrons should break loose from their atoms and, under the stimulus of potential difference, travel freely along a conductor. Indeed, the freer their movement the better, so long as it is confined to the conductor, since any restrictions (probably due to collisions with other electrons) cause ohmic resistance which generates heat. It is when electrons leave the conductor that troublesome characteristics are revealed. One example of these objectionable activities was demonstrated by the failure of some of the earlier cables for 33 kV and above, the insulation of which was injured through bombardment by electrons which, under high electric stress, acted as projectiles. Non-extinction of arcs at circuit-breaker contacts furnishes another.

Advantages Preponderate

Nevertheless, the benefits increasingly obtainable from electronics, *i.e.* the emission of electrons from heated surfaces, very greatly outweigh any difficulties they have brought. Leaving out of account what may be still to come in the way of wireless communications (including television), the most immediately obvious of such benefits is the vapour lamp, especially the new daylight fluorescent type. The field of rectification in its diverse forms from transport to the sensitive control of motors for large steel mills or small machine tools or sequence operation of contactors, and also in its effect on the future possibility of DC transmission, would by itself provide more than enough compensation.

In a recent survey of the scope of electronics Mr. Clark H. Minor, president of the International G.E.C., points to two developments of recent years, the cyclotron and the induction electron accelerator, as likely to exercise a revolutionary influence on future tendencies. The first of these is an inexhaustible source of transmuted radio-active elements with their varied spheres of usefulness in hygiene and in industry. The second speeds electrons to 100,000 kV and produces X-rays of corresponding power. Among numerous references to the applications of electronics, he referred to the electron microscope, which can magnify virus 100,000 times, as something that will aid agriculture as well as medicine.

A quite important duty of electronic devices is to relieve workers of the monotonous tasks of sorting and counting, at the same time securing greater accuracy. Mr. Minor raises the interesting question of the prospects of high frequencies being employed for cooking and space heating.

Electricity from Released Energy

At present the cost of electronic devices appears to be higher than that of alternatives and their adoption may be gradual as their merits become evident.

One natural query is whether there is any likelihood of the atomic energy being converted into one of its manifestations, *i.e.* electricity. Energy equivalent to about half that of the kWh generated in Great Britain could be provided if the atoms con-

tained in a gallon of water were completely destroyed. Again, an atom of the element uranium 235 when smashed in a cyclotron produces about 17,000 times the energy released by burning an atom of carbon in coal. While there have so far been no apparent indications that such data can be turned to practical use, it is evident that only the surface of the scientific possibilities has been scratched. There can be little doubt that other avenues of approach to the problem will be presented if the present rate of successful research can be maintained.

Purpose

WHATEVER opinions may may be held about "art for art's sake," it is clear that engineering cannot have any such self-contained end in view. Its purpose is the performance of a particular kind of service most efficiently at a price that brings it within the reach of those wishing to make use of it. As Sir Frank Gill pointed out in the first of a series of lectures on "Engineering Economics" reported in this issue, an engineer owes it to those who trust in his technical knowledge to select the best scheme of many possible variants by sound economic methods, which he should be taught early in his career.

Public Lighting

FROM time to time there is a revival of the proposal made in the earlier days of the war that a greater measure of public lighting, extinguishable from a central point, should be permitted. There has lately been a great deal of discussion of the subject again, but once more the Home Secretary has put a damper on it by declining to allow any raising of the present "starlighting" standard. Mr. Morrison described the Blackburn arrangements for the central control of the existing lighting as "an unnecessary capitulation to the blackout doctrine."

Strikes in Wartime

IN the House of Commons last Friday, the Minister of Labour and National Service warned those responsible that stern measures would be taken to deal with unauthorised strikes. Although the emphasis was upon "unauthorised," only very provocative intransigence on the part of employers can justify any strikes in wartime when the strikers' fellow men are facing discomfort and death for small pay. Elaborate machinery exists for the discussion and settlement of conditions and wages and the possibilities of this should be thoroughly exhausted before any stoppage of work occurs. At the same time there should be no undue delay in the operation of this machinery; there seems to have been occasions when the tempo might have been a little faster.

Clean Coal

MOST of the great progress made in fuel technology of recent years has been due to developments at the user's end, as Dr. R. Lessing mentioned in his Institute of Fuel lecture yesterday evening. A more knowledgeable selection of coal and an improvement in appliances for burning it have been more in evidence than have attempts to adapt the components of coal to the best combustion conditions. Coal cleaning on the lines he proposed would go far to reduce the balance. The difficulties are in organisation rather than in technique, but probably something could be done on a less ambitious scale to demonstrate the economic advantages of the author's proposals.

Unjustifiable Fears

"JANUS" of the *Gas Times* gets an inordinate amount of attention here, but he is always raising interesting points. Lately he has trembled for the gas industry's future because E.D.A. is advertising electricity as "the life blood of the nation at war." And this after advertisements claiming that without the by-products from gas-making the country would be down and out. The fact is, of course, that both industries are of the first importance now and in peacetime and, anyhow, we consider that current gas advertisements are very effective.

Local Government Services

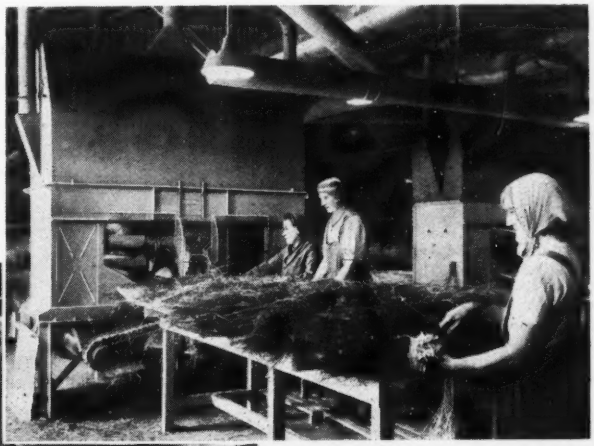
RECENTLY the Association of Municipal Corporations protested against proposals to redistribute services performed by local authorities before steps had been taken to ascertain and determine the best units for local government and against the transfer to Government Departments of any of these services. Sir William Jowitt, Minister without Portfolio, has informed the Association that the Government cannot hold up reforms which are considered urgent until the wider question is settled.

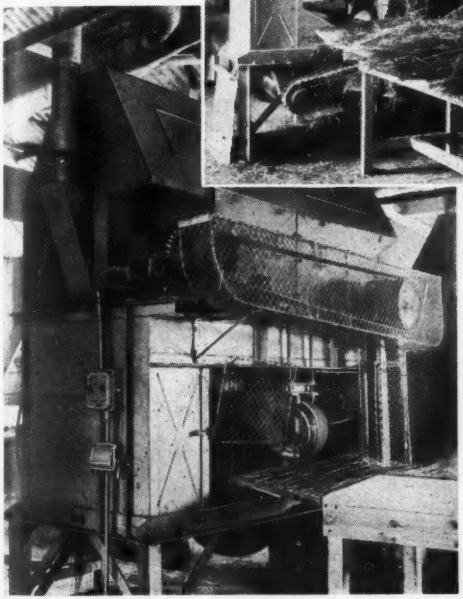
Flax Milling

Electrical Methods Applied to a Revived Industry

AT one time flax growing was a very considerable and prosperous industry in this country. In the past century or so, however, so keen had become the competition from Russia, Belgium, Ireland and elsewhere that at the outbreak of war only two British producing centres remained in existence to carry on the tradition, one in Kent and the other in Northamptonshire. The outbreak of hostilities and the consequent shutting off of this country from its principal sources of supply, coupled with the increased demand for all manner of wartime purposes, *e.g.* for parachute harnesses, fire hoses and various kinds of canvas goods, etc., completely altered the situation and the resumption of home production of this important commodity became of extreme urgency.

As a result, besides encouraging in every way possible the growing of flax (which, incidentally, should not have been too difficult since it is a hundred-day crop which fits in well with a normal rotational scheme), the Ministry of Supply immediately set about the establishment of seventeen new flax mills in various parts of the country. All these are now in full production and between them they have an output sufficient to meet all essential wartime needs for products that can be manufactured from green flax.



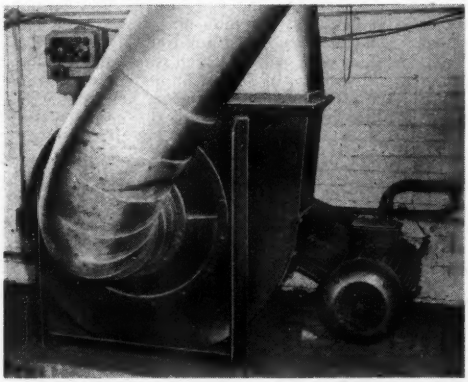


Feeding the flax into the de-seeding plant and (left) rear view showing the flax leaving the machine

Although the processes are essentially the same as those employed in bygone days, the modern methods eliminate manual handling to a very large extent and, with the aid of widespread electrification of the plant, have speeded up production very considerably. A more or less standard equipment has been developed and installed in each of the works.

The mill which we inspected a few days ago serves a production area within a radius of about 40 miles. The flax is pulled out of the ground by the roots, not cut, in order to provide the longest possible fibres and also to ensure good keeping qualities, the roots acting as a

kind of seal. Some straws may be ready for treatment within a month after pulling, but others need seven months or more to mature. When ready they are taken to the mills in small sheaves. These are pitchforked on to elevators (three) which carry them up to the first floor. Each elevator is individually driven by a ¾-HP motor. Regulation of the speed of supply of the sheaves is effected by the operators at the delivery end of the elevator, but in addition emergency "stop" switches are provided for the use of the loaders.

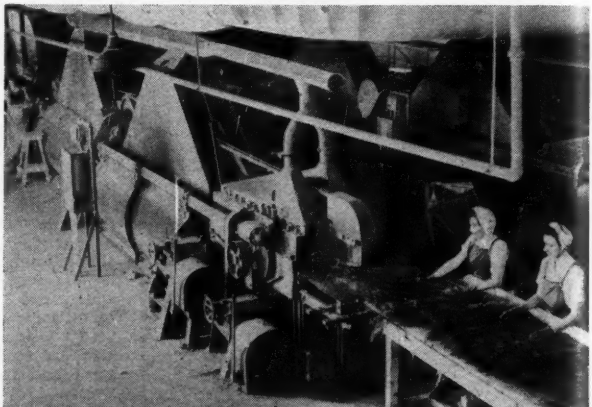


Extract fan for removing dust from the de-seeders

Inside the mills three separate production lines have been arranged, one fed by each of the elevators. On being discharged at the top of the elevators the sheaves are picked up by hand and placed on tables leading up to de-seeding machines, care being taken that all the sheaves are the same way round, that is, with the root end to the right facing the production line. On these tables the string round the sheaves is cut and the flax is opened out, butted up (the root ends arranged level) and fed into the de-seeders (made by Ransomes, Sims & Jefferies). Here two large metal combs going backwards and forwards remove the seeds from the seed end of the plant and the dirt, etc., from the root end. A belt and rubber-tyred wheel pumped up to a certain pressure hold the flax while it is passing through this machine, which is fitted with a 2-HP, 950-RPM motor and a "stop" switch close to the operator in charge of the feeding process. The dust, etc., is removed at the top of the machines through ducts connected with a 3-ft. diameter exhaust fan driven at 1,455 RPM by means of a 3-HP Lancashire Dynamo motor.

Leaving the de-seeders, the flax is gathered up by hand and fed either directly down chutes to the scutching machine or if more flax is being delivered by the de-seeders than can be dealt with immediately (as in the case when at certain times of the year there is an urgent demand for seeds) *via* binding machines (¾-HP motors) and belt conveyors driven through "Radicon" gearing by 2-HP, 750-RPM motors to store until required.

The aim of the scutching process is to remove all but the long fibres from the flax. From the chutes the flax is butted up again and passed, bent in an inverted "V" shape, by rubber belts between cogged rollers. "Alligator belts," so named from their appearance, carry the flax on through the first set of beaters. Here, by means of two blades, very much like those of a lawn mower, revolving in different directions the root and a third of the plant is beaten out until only the long fibres remain. The flax is then transferred to another alligator belt and carried



One of the scutching plants

through a second beater which similarly treats the remaining two-thirds of the seed end.

Driving each scutching machine is a

An electric baler for dealing with the "rug"

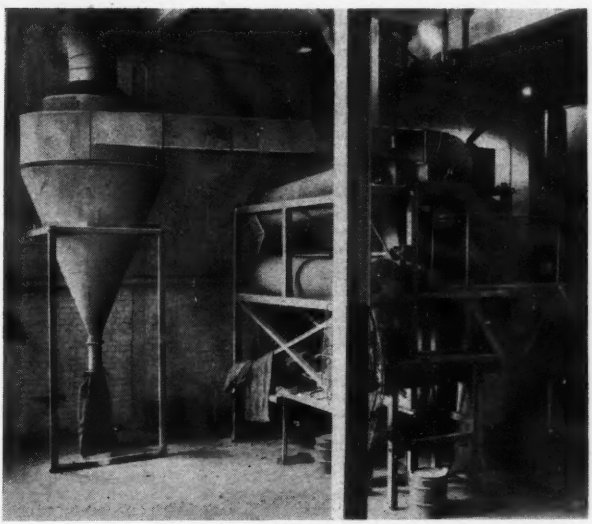
25-HP motor running at 975 RPM. As six speeds are provided for the alligator belts as well as for the feeders and beaters, the speed of flow can be regulated very precisely to deal with the inconstant moisture content of each batch of flax due to changing atmospheric conditions. Each scutching machine has a main control switch located in a central position with emergency stop switches at each end. The dressing end of the apparatus has been equipped with fluorescent lighting.

Each scutcher can handle about half a ton an hour. The process just described is known as "green scutching." It cuts out the intermediate process known as "retting," a bacteriological action which is in effect controlled rotting and gives a somewhat softer fibre. Apart from saving time, the fibre produced by the green scutching process is in some ways to be preferred for the purposes for which it is now being used.

Dust is removed from the scutchers through ducts served by a central extract fan (18-HP, 1,460 RPM Lancashire Dynamo motor with Allen West starter), a general-purpose mobile Sturtevant industrial type vacuum cleaner being used for general cleaning of the plant. The waste from the beaters, known as "rug," falls down chutes to a separate department below where tow, largely used for making canvas, is produced. Belts (all driven through shafting by the same 3-HP motor) under each beater carry the rug to low-speed shakers (3-HP, 715-RPM motors) which remove the "shives" or small particles of woody tissue. The rug then goes through rollers (15-HP, 975-RPM motors), beaters (5-HP, 1,430-RPM) and high-speed shakers (4-HP, 955-RPM). An electric baler (Edwin Mills & Son), driven by a 3-HP, 560-RPM motor, compresses the material ready for dispatch.

In the seed room "roughing out" plant first shakes out the straw combings and then a series of reciprocating riddles screen out the seed, various elevators linking up the different stages. A drying plant is used if necessary before the final cleaning process.

In view of the considerable amount of dust



A portion of the seed cleaning plant

that must inevitably be produced in a mill of this kind, a plenum air-conditioning plant has been installed, the air being admitted to the factory through canvas tubes. The fan used for this purpose is operated by an 18-HP, 1,250-RPM motor. Except where otherwise stated all the motors and their control gear are of Metropolitan-Vickers manufacture.

South African Notes

From Our Cape Town Correspondent

POINTING out that present stocks of refrigerators in South Africa are low and the prospects of receiving further supplies are remote, the Controller of Building Materials states that permits for ordinary domestic replacements cannot be considered. A similar position exists in regard to electric cookers, although it is hoped that assistance given to a South African factory will again enable sufficient output to be maintained to meet essential services and replacements. It has come to the notice of the Controller that certain firms are advising their customers whose cookers and refrigerators are out of order that they are beyond repair. This appears to be done in the hope that the Controller will issue permits and thus enable the firms to supply new cookers and refrigerators and repossess the old ones, which can then be reconditioned and sold without restriction as second-hand. This aspect is being closely watched and it may be necessary for special steps to be taken to safeguard the public.

Manufacture of Electrical Accessories

Efforts are being made to manufacture in South Africa as many as possible of the electrical goods required. According to the chairman of the Electrical Engineers' Association, South African electrical manufacturers could meet most of these needs, provided that sufficiently large orders were placed. In Durban, the manufacture of three-pin plugs is being undertaken in accordance with British Standard Specifications. The firm responsible will shortly be producing limited quantities of the 5-A size, moulded in bakelite, which will be followed by 15-A plugs. The brass pins, inserts and screws will all be made in Durban. The firm has also in hand the production of lampholder parts and 30- and 60-A fuse parts.

Electric motors are also being made in South Africa and the largest to be produced so far is one rated at 2,250 HP for use on a Rand gold mine. Johannesburg engineers took six months to produce this motor, which was built to a local design from purely South African materials.

Wiring Regulations

As far back as August, 1941, the Durban City Council adopted as its wiring regulations the Standard Regulations for the Wiring of Premises published by the South African Institute of Electrical Engineers, subject to the usual promulgation by the Administrator. Some delay occurred over this promulgation, as negotiations were necessary with other Natal municipalities who also desired to adopt the same regulations, that a " group " promulgation might be so made.

The question has been raised as to the possible effect of the promulgation of the regulations as by-laws upon existing installations which do not comply with the new requirements. Following consultations, the city electrical engineer has suggested the insertion of a proviso in the regulations to safeguard the owners of such installations. With this amendment the regulations have been adopted for submission to the Administrator for promulgation, upon which the existing wiring regulations approved of in February, 1935, will be replaced.

Reinforced-Concrete Poles

In order to conserve supplies of steel, considerable attention has lately been directed in South Africa towards the application of concrete as a substitute. Tests have been made with locally manufactured reinforced concrete poles for carrying wires for trolley-buses. In Salisbury, Southern Rhodesia, reinforced concrete standards have been used for overhead transmission lines. A 33-kV line was recently completed with a gang consisting of a handyman, rigger and 30 natives, and an apprentice to dress and earth the poles. Three poles were erected each day, and the complete pole erection for a distance of five miles was finished in four weeks.

Frequency Standardisation

For many years the power supply system of the Victoria Falls & Transvaal Power Co., Ltd., has, by arrangement with the company's consumers, been operated at a frequency of 51·5 c/s, although the theoretical frequency has always been 50 c/s. During the past few months, however, the frequency has been gradually stabilised at 50 c/s. One of the immediate results is that it has been possible to interconnect the system with that of the Pretoria City Council. Also, the interchange of power with the Johannesburg City Council has been simplified.

Telephone Improvements

Practically the whole trunk telephone system of South Africa has been duplicated and modernised. Johannesburg has been joined to Cape Town and Port Elizabeth by the latest high-capacity cables, which have been laid over new routes. Much heavier traffic can be handled on a cable laid between Johannesburg and Springs. This cost almost £120,000 and allows 500 simultaneous conversations. The cable from the Rand to Pretoria completed some years ago was so heavily burdened that of its 300 pairs of wires only 50 were free to allow further expansion of traffic. By using the carrier system the Johannesburg connection with Durban, Rhodesia, Portuguese East Africa and other key points has been improved.

Tobacco Experiment

The Salisbury City Council has instructed the electrical engineer to prepare a report on curing tobacco by electricity, a matter to which this engineer has given considerable study. It is planned to devise an apparatus which will alter the temperature automatically at desired periods. This will be of considerable value to a big tobacco growing region like Southern Rhodesia.

Public Lighting

Views on Post-War Installations

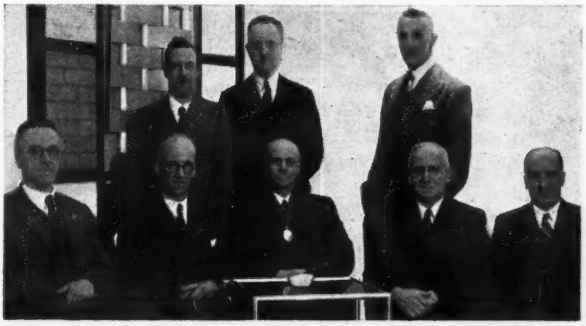
A TWO-DAY conference of the Association of Public Lighting Engineers was held in London on September 22nd and 23rd. In his presidential address, Mr. E. J. Stewart (Inspector of Lighting, Glasgow), dealt with some of the effects of the war on street lighting. Fanciful suggestions regarding post-war development included self-luminous walls or road surfaces as backgrounds and luminescent coatings to be used for street obstructions, but probably for some years the same light sources and fittings would be used as before and in generally similar forms, mounting methods and heights. The last-named would not be far from those recommended by the Ministry of Transport Departmental Committee.

The question arose as to whether some kind of standard, pole or pillar, tall or short, would still be the usual support. Would cast iron go out, in spite of its advantages, because of its liability to breakage? Would steel poles be more readily available after the war than during it? Would steel tend to go out of favour on account of its rusting or had the war brought any new, easy and inexpensive way of counteracting rust? What would be the effect of the war on the supply and design of concrete standards? Columns of some sort might be expected to remain the most usual form of support, and brackets might be incorporated in the walls of new buildings. Span-wires appeared to be in disfavour nowadays although they still offered benefits. In Glasgow, in back lanes and courts, aerial cables and lanterns were being suspended from span-wires.

As regarded fittings, war experience had made more obvious the value of robustness, freedom from corrosion, a certain degree of standardisation (particularly for the renewal of parts), easy access, minimum trouble with bolts, nuts and washers and screws and small parts. Possibly for some time there would be fewer types on the market and a greater degree of standardisation than before.

Would different methods of lighting be adopted for different types of streets or areas? A possible arrangement was one seen in the Netherlands in 1939, where filament lamps were used for the urban centres and shopping areas, mercury lamps for the main traffic routes in the outer districts and adjoining streets, and sodium lamps on the arterial roads outside the towns. In Glasgow they had tried something similar before the war, and it was hoped to extend it and there would be many more miles of lamps mounted at 19 ft.

Installations made during the past ten years, even if rather out-of-date, would have to be retained for some years. All questions of the system to be adopted ought to be considered as soon as wartime commitments and availability of staff permitted. Decisions ought to be taken now as to which streets and lamps were to be grouped together in design and perhaps in control. Testing sections should be established or re-established.



Back row (left to right): Mr. W. J. Jones (E.L.M.A.), Mr. E. C. Lennox (North Eastern E.S. Co.), Mr. N. V. Everton (E.L.M.A. Council). Front row (left to right): Mr. T. Wilkie (Leicester), Mr. W. N. C. Clinch (Northmet Power Co.), Mr. E. J. Stewart (president), Mr. C. I. Winstone (past-president), and Mr. H. C. Brown (treasurer)

It had been stated by the Ministry of Transport that there would be probably four times as many motorists on the roads as there had been before the war, and this would call for the provision of improved lighting. Despite higher costs on account of wages and materials he believed the public would demand even better street lighting, at least on traffic routes.

Considerable extension of central or automatic control of lighting and extinguishing was to be expected. Radio control could be adapted for the purpose and also for conveying instructions to workers in distant streets and for receiving reports from them.

The Association expected to be consulted

with regard to new legislation and specifications. Perhaps a suitable criterion for avoiding glare would be established but probably no rigid rules would be made compulsory for street lighting. No doubt illuminated advertising and " display " signs would be increasingly controlled. Government action was desirable to secure uniformity between contiguous areas.

What would be the effect of the war on the aim of the Association that public lighting should be regarded as a service deserving independent status, with its own local organisation under a chief having experience and trained knowledge appropriate for a public lighting engineer? It was hoped to re-commence classes in illuminating engineering at the earliest opportunity for engineers and also to educate the general public as to the value of good public lighting.

A Clean Start

An address on street lighting, past, present and future was given by Mr. J. M. Waldram (G.E.C. Research Laboratories). His view was that after the war there would be an excellent opportunity for making a more or less clean start with street lighting and for incorporating new ideas, although to begin with the amount of new work possible might be limited. For some time after the war, he said, we should have to use what we already had as long as it was serviceable. He demonstrated the obstacles to the adoption of fundamentally different methods, such as had been suggested, including kerb lighting, searchlights with the light projected in the direction of the traffic or reflected from the sky, and the use of balloons for suspending the source of light.

As laboratories had been fully occupied on war work, no striking new developments were likely to be ready by the time the war ended. Moreover, anything new would have to be tested under practical conditions, which was impossible in the black-out. In the future, new materials and new methods of manufacture would doubtless influence street lighting equipment, maintenance, reliability and weathering.

With the possible exception of the 5-ft. 80-W fluorescent lamp, no new development in light sources was expected for street lighting. Its most obvious advantage was its daylight colour. Another advantage was that these lamps struck at once and also re-struck after a failure in the supply. Their light was difficult to control accurately, which was the very essence of street lighting. They also had the great disadvantage of considerable length and fragility.

The three main problems to be faced were residential street lighting, arterial-road lighting away from towns and double-carriageway lighting.

Mr. W. N. C. Clinch (vice-president) expressed the view that there should be some stabilising authority in connection with street lighting which would over-ride the powers now possessed by the various local authorities.

Mr. L. Minchin (Gas Light & Coke Co.) said that the pre-war method of lighting streets which resulted in a number of black patches between the lamps was likely to be dangerous. He suggested that a certain number of smaller sources of light should be placed on shorter posts, possibly with a cut-off or obscuring globe, to fill in these black patches. Mr. D. Sandeman (Stepney) thought that the qualifications of a lighting engineer were not well defined. He did not agree with a suggestion by Mr. Waldram that light coming from an angle of 85 deg. was precisely the angle at which glare was worst, and that the cut-off type of illumination was the best.

Mr. F. F. Middleton (Revo Electric Co.) advocated a distribution of the light in wide beams across rather than along the carriageway. The region 150 to 180 ft. ahead of the motorist was the most important. If the pavement and verge were illuminated to a brightness equal to that of the road, the motorist was able to see an obstacle and would have ample time to avoid a collision. Mr. F. C. Smith (Gas Light & Coke Co.) suggested that in the past the economic position had led to the use of highly directional systems of lighting.

Control by Transport Ministry

Mr. E. C. Lennox (North Eastern E.S. Co.) said that in the past competitive street lighting for the least amount of money had had adverse effects particularly on arterial roads running between the large towns. The authority to control the lighting should be the one which controlled the roadways, *viz.*, the Ministry of Transport. Alderman Thraves (Sheffield) was against handing over street lighting to the Ministry of Transport. If a competent lighting engineer showed the local authority what he could do, then they would not be parsimonious.

Mr. N. Boydell (Eastbourne) expressed the view that sodium lighting had remedied the problem of dark patches between lamps on arterial roads. In shopping centres the problem was different. In Eastbourne they had favoured mercury lighting with dispersive lanterns because of the higher reflecting effect of the shops and buildings on each side of the road.

Mr. G. E. Hill (Gravesend) called for an investigation into the effects of various road surfaces in relation to lighting installations.

Two addresses were given on the design of lamp columns and lanterns in relation to post-war town planning and reconstruction by Mr. H. C. Bradshaw (secretary, Royal Fine Art Commission) and Dr. S. English (Holophane, Ltd.), both of whom dealt with the matter from the æsthetic point of view.

At the luncheon on September 23rd, Sir Charles Bressey, who was for twenty years Chief Engineer to the Ministry of Transport, proposed the toast of the Association. He spoke of the need for a more unified control of street lighting throughout the country, and of the importance of adequate street lighting in reducing the number of accidents on the roads. He expressed the hope that the Association would lay stress on the necessity for uniform lighting and that the recommendations of the Departmental Committee which reported in 1937 would be universally adopted.

Mr. P. Good (director, British Standards Institution), responding to the toast of "The Guests," expressed the desire that the activities of the Association should be extended and that the authorities responsible for public lighting should have at their disposal the best possible advice from their responsible officers. At the same time, it was hoped that public lighting engineers would receive adequate support from their committees.

Engineering Economics

Testing the Relative Merits of Alternative Plans

THE first of the University of London Extension Lectures on "Engineering Economics" was delivered by Sir Frank Gill on September 21st. In this the principles of economic analysis laid down in the paper which he presented before the three senior engineering Institutions on March 25th were applied to engineering plans.

In spite of the consensus of opinion shown during the discussion of this paper that a knowledge of the subject formed a necessary part of the equipment of all engineers, it was now taught, so far as evidence was available, at only two universities and one technical school.

The object of the engineer was, very largely, to construct something at a cost that made it pay. Knowledge limited to scientific aspects was not enough, and many engineers lacking early guidance regarding the importance of wise expenditure on plans (before any expenditure on construction), learned it only through, possibly, bitter experience. Engineers were in a position of stewardship in regard to money spent on behalf of others and this ethical aspect alone would warrant the co-operation of the universities.

Three Questions

Sir Frank quoted three questions that should be raised when examining plans critically: "Why do anything?", "Why do it that way?" and "Why do it now?" Engineering economics was not accountancy or cost accounting, but an essential part of design. It did not relate to such specifically engineering features as steam pressures and load factors or workshop organisation. It was concerned with the process used for the purpose of testing the relative merits of several alternative plans.

Enough time should be spent at the design stage in order to save later waste of time on possible alterations as a result of too quick a start on construction. The alternative plans should be analysed to evaluate their financial, technical and intangible features, so that experienced judgment could choose the most suitable for the purpose.

The only economic differences between plans were in time and money. The time at which the money was spent was a most important factor. Examples should be chosen to teach the necessity of economic analyses, a methodical way of making them and the effect on selection of variations in costs deliberately introduced. Costs would be introduced merely as illustrations, as closely accurate figures were unnecessary.

The procedure adopted by an organisation using this kind of analysis in estimating would take two forms. The first, field work, dealt with individual cases and took little time. The second was that used at the head office in setting up costs, ratings and methods for the use of the first; this work, which covered the whole constructional activity of the organisation, involved much labour and could be done piecemeal and altered from time to time. Examples of field work were given which indicated how depreciation percentages were made up and how essential was the possession of a set of compound-interest and sinking-fund tables.

[The next lecture of the series is to be held on September 28th. A note on the abridged edition of Inwood's Tables of Interest, to which Sir Frank referred as containing all that engineers required in this way, appeared in our issue of September 17th.—Eds., *Electrical Review*.]

Bulgarian Railway Electrification

According to Donau Radio, a hydro-electric power station at Byela-Slatina was brought into commission on August 1st. This is one of the stations being built for the electrification of the State Railways. The scheme is being carried out in two stages; first, the lines Sofia-Mezra, Sofia-Pernik and Sofia-Birot (Yugoslavia), and second the line from Sofia to Svilengrad.

Coal Preparation

Specified Types and Grades

AT a meeting of the Institute of Fuel on September 30th, at which the chair was taken by Lord Hyndley, Controller-General Ministry of Fuel and Power, Dr. R. Lessing presented a paper on "The Rational Preparation of Coal." In this he argued that the division of coal into specified types and grades would greatly assist the task of cleaning coal before delivery to the user.

Coal washing plants, which depended on differences of buoyancy in currents of water of particles of varying specific gravity, allowed most of the contaminating substances to remain. The author's proposal was that all coal (and not only slack) should be cleaned and crushed to 4 in. or less on arrival at the surface, possibly after rough screening of smaller portions with a secondary removal of slack. Dedusted coal would be separated into specific gravity ranges, *viz.*, bright coal below 1·35, dull coal and middlings from 1·35 to 1·6 and mineral refuse above 1·6. The picking belt should be abolished.

The effects on the chief branches of fuel utilisation of separating the coal components were discussed in detail. The largest individual outlet was for steam raising, for which the following charges were affected by ash content :—Transport and handling of coal, laying off boilers for cleaning furnaces, removal of ashes and clinker, power for forced- and induced-draught fans, repairs and maintenance of coal-handling plant and grit catchers, handling and disposal of ash, grinding (with pulverised fuel), combustible in ashes and capital charges on boiler installation.

After deducting the costs (including capital charges) of dedusting and cleaning and allowing for loss of sales (12·6d. per ton) from the saving in steam generation (28·2d.) the net saving due to cleaning would be 15·6d. per ton with mechanical stokers. For pulverised-fuel firing, the corresponding figures were given as 15·9, 35·4 and 19·5d.

Advantages of Dust-free Coal

An important advantage in using dust-free coal components with mechanical stokers (exemplified at Leicester generating station, where the dust was used in a pulverised fuel boiler) was that the air passages in the fuel bed were unimpeded, thus guarding against short-circuiting and promoting even combustion.

A second advantage lay in the avoidance of dust from the fuel bed which appeared as unburned carbon in the flue dust or, if burned, added to the quantity of the latter. Certain impurities in the dust were trapped at points where the gases began to cool and, with the gases, formed compounds (notably SO_3) which affected the availability of stoker-fired boilers. True blending of different coals would be practicable when coals below critical size were mixed after being freed from dust and mineral impurities.

The scheme proposed envisaged the balancing of the available tonnage of each component against the demand by different classes of user, but this called for a Government investigation. Figures for nine producing areas gave the following percentage averages per seam of components: Bright coal, 75; dull coal, 25; fusain, 2·5; shale, etc., 2·5. Subdivision of the fuel into characteristic components would facilitate the specification of coals.

Type and Value

Type, as expressed by caking value and (of less significance) volatile matter, must be distinguished from quality within each type, which depended upon free moisture and ash content. Calorific value was a function of the type modified by contamination with water and mineral matter, but Dr. Lessing maintains that it must not be regarded as a criterion of suitability.

In 1938, the proportion of cleaned saleable coal was 45·4 per cent. of the total output, but most of the cleaning plants were inadequate. Considering the treatment of 100 million tons (rather less than half the total output), the cost of suitable plant would be £350 per ton per hour and on a basis of two eight-hour shifts per day and 550 shifts each year, the capital outlay would be £8,000,000, or 1s. 7d. per ton of throughput, spread over 60 to 100 plants. Operating costs should not exceed 9d. per ton or £3,750,000 for the 100 million tons.

The technical advantages could be assessed fully only by commercial operation with separated coal components, but the saving from 60 million tons of coal consumed for steam raising had been estimated (Waite) at £3,674,000. Annual savings in gas works have been calculated at more than 2s. per ton, or £1,000,000 on 10 million tons only, and in metallurgical coke, with coal at 20s. per ton, about £2,000,000.

The author calculates that a reduction by one-third of the ash in house coal would lower the annual cost of refuse disposal by over £1,000,000 and transport and delivery costs by £500,000. Such figures, however, merely illustrated the potentialities of planned coal preparation.

Industrial Trucks

Two-Ton Three-Wheel Battery Model

THE Brush Electrical Engineering Co., Ltd., has recently produced a two-ton electric industrial truck for handling goods in works, railway stations and on dock-sides, etc. It is of the three-wheel type for manœuvrability (6 ft. turning circle) and an outstanding feature is the bicycle type steering which ensures " finger-tip " control under all loads.

Fully loaded, the truck will travel at five to six miles per hour and the capacity of the interchangeable battery allows a normal day's work to be carried out on one charge; if continuous 24-hour service is desired an additional battery can be supplied. Four types (low or high loader, fixed or elevating platform) are available without change in the basic design.

The elevating gear with which the truck is fitted enables loaded stillages to be picked up in fifteen seconds; when the load is ready there is no waiting time

The truck frame is of fabricated box section, electrically welded, with the addition of cross braces and gussets for strength. The driving unit is self-contained and is called a " pony unit." It consists of totally enclosed motor and reduction gear, axle, controller, and steering column. The drive is by chain and sprocket with final drive to the axle by spur gear. The single front wheel drive arrangement enables the truck to be steered and driven almost at right angles to the truck centre-line, thereby ensuring the minimum possible turning circle. The " pony unit " can be removed from the chassis in a few minutes and is interchangeable. The front wheel is of the detachable type with split flanges, and is easily removed. In the case of the high loader with pneumatic tyres throughout, all wheels are detachable and interchangeable.

The motor has been specially designed to be capable of meeting heavy working conditions with trouble-free service, and is of the totally enclosed type. The fields are separately wound to give series-parallel control. The insulation throughout is class " B " to BS 173 and the one-hour rating of the motor is 38 V, 55 A at 1400/1500 RPM.

The controller is fitted to the steering column and turns with the steerage, thus ensuring that the cables between controller and motor are not subject to twisting. Five contactors are fitted, giving four forward and four reverse speeds using the series-parallel field type of control. The master controller is of the stud type, operated by a light foot accelerator pedal and is fitted with an automatic delay-action device which limits the rate of acceleration to 3 or 4 seconds per speed.

The battery is of the lead acid, flat plate type, consisting of twenty cells of 144 Ah capacity. Exide, D.P., Britannia or Tudor batteries are normally supplied. Nickel-iron batteries can be fitted if specified. The battery is enclosed in a strong metal container and is easily removable for the replacement of a fully charged battery where continuous 24-hour service is required.

The loading platform is steel chequer plate provided, for elevating, with a jack and hand-operated pump which can be operated from the driving seat. The platform with full load can be lifted in fifteen seconds. A hand-operated release valve is fitted by means of which the platform may be lowered at varying speeds.

The brakes are of the Bendix internal-expanding type, operated by foot pedal. A pistol grip hand brake is also fitted for use when the truck is stationary. The high-tensile-steel rear axle, which is of the fixed type, is of ample dimensions. It is situated under the centre of the load. The wheels run on taper roller bearings. The driving wheel is fitted with a heavy-duty 18 in. by 7 in. pneumatic tyre. Trucks for " low loader " duty are fitted with 10 in. by 5 in. solid tyres on the rear wheels and for " high loader " duty, 18 in. by 7 in. pneumatic tyres are

provided. A wide upholstered driving seat is fitted, ensuring ease of mounting and comfort for the operator.

Charging equipment can be provided if required, but provision is made for a 2-pole charging socket with earthing and pilot contact. The starting rate of charge is 28 A, finishing off at 14 A.

Overall dimensions are length 10 ft. 6 in.; width 3 ft. 8 in. and height 4 ft. 2 in. Platform heights from ground level are 11 in. (low loader) and 18 in. (high loader), and when in the elevated position 15 in. and 22 in. respectively. The total weight of the complete truck with battery is approximately 20 cwt.

Electrical Benevolence

Work of the E.I.B.A. in 1942

MANY difficulties have been encountered by the Electrical Industries Benevolent Association during the war but its report for the year ended December 31st, 1942, shows that it has continued to do much in relieving the necessity and anxiety of electrical men and women who have met with bad fortune. The report emphasises again that the Association is not a mere bestower of cold charity but a means of bringing assistance and encouragement to those who desire above all to help themselves.

In 1942 about 400 people, taking into account the wives, children and other dependants of the applicants, were helped ; 178 cases were dealt with and in 114 cases weekly allowances were made throughout the year. The Relief Committee and its branch committees had to deal with over 1,000 agenda items. While the amount expended in grants, pensions and allowances increased by £1,101 to £9,741, the administrative costs were £140 less.

The charitable income of the Association, after allowing for reserves, was £13,151, an increase of £192. Including investment income and refunded relief grants the total receipts were £16,206, an increase of £583. Thus the balance carried to the balance sheet is only £396 less than in the previous year.

A number of substantial donations are recorded and reference is made to the collections organised by the Electrical Contractors' Association, the Electrical Wholesalers' Federation and B.E.A.M.A. Substantially increased contributions were received from municipal and company-owned electricity undertakings as the result of a special appeal by the president (Mr. E. E. Hoadley) in the autumn of last year.

The report concludes with an appeal for further assistance and stresses the advantage of covenanted subscriptions.

Annual Meeting

At the annual general meeting on September 24th, Mr. E. E. Hoadley was re-elected president for a second year. Mr. J. N. Stephens and Mr. J. Y. Fletcher were re-elected chairman of the Court and hon. treasurer, respectively. Mr. F. B. Duncan, Mr. S. R. Mullard and Sir George Nelson were appointed additional members of the Council.

In proposing the adoption of the report and accounts Mr. Hoadley, who presided, paid tribute to the work of Mr. J. Y. Fletcher, honorary treasurer, Mr. L. C. Penwill, chairman of the Finance Committee, and the other members of that Committee for the satisfactory position of the year's finances. Mr. Hoadley also referred with appreciation to the work of the chairman (Mr. L. C. Sharp) and the members of the Relief Committee which regularly met with solid attendances, covered formidable agendas, and treated each case absolutely individually in a personal, effective, and kindly way.

B.E.A.M.A. Appeal

While it did not affect the accounts of the year under review, considerable work had been done in that year by Mr. V. Watlington and Mr. J. N. Stephens towards launching another B.E.A.M.A. appeal, which had actually been achieved since the close of the year. All this could not have been done without the Association's indefatigable secretary (Mr. Fothergill) to whose credit was to be placed the fact that the E.I.B.A. was not just "holding the fort," but had been steadily working with an eye to the future.

Sir Archibald Page seconded the resolution and associated himself with Mr. Hoadley's tribute.

Mr. J. N. Stephens, when he introduced the subject of president for 1943-44, said that no other nomination had been received, and that Mr. Hoadley had agreed to take office for a second year in order to enable him to complete the work which he had started in launching the appeals to supply authorities and companies, the income from the former having trebled during Mr. Hoadley's year of office. These appeals had involved a large amount of Mr. Hoadley's personal time.

The retiring members of the Council were re-elected *en bloc*, as were the members of the Court and all its various sub-committees. Mr. L. C. Sharp proposed a vote of thanks to Mr. Hoadley.

PARLIAMENTARY NEWS

By Our Special Reporter

Reorganisation of Supply

IN the House of Commons on September 21st, Mr. Critchley asked the Minister of Fuel and Power if he would give an assurance that no scheme would be drafted for the reconstruction of the electricity industry without consulting the several bodies which represented the industry and whose interests would be affected by any such proposals.

Major Lloyd George said that the Government would not put forward any proposals for reorganising the electricity supply industry without previous consultation with representative bodies of the industry.

Severn Barrage Scheme

Sir Stanley Reed asked the Minister of Fuel and Power whether, in view of the increasing demands for coal, he would direct the Electricity Commissioners to investigate the Severn Barrage hydro-electric scheme.

Major Lloyd George said that in the course of a debate on March 17th, in the House of Lords an undertaking was given by the Government that certain technical aspects of the Severn Barrage Scheme would be investigated. A preliminary investigation had taken place, but further technical enquiries of a detailed nature would be necessary. In any case the scheme would be bound to take many years to complete and could not possibly assist in relieving the present shortage of coal.

"Sunray" Lamps

Mr. Hannah asked the Minister of Health why some firms and not others were permitted to purchase "sunray" lamps for the benefit of their workers employed on night shifts, although medical men urged their use in all cases where they could be employed and the Ministry of Labour was insisting on the maximum effort for welfare work.

Miss Horsbrugh said that the Ministry of Health acted as adviser to the Board of Trade on applications by factories for licence to acquire these lamps. In respect of certain types of apparatus the Ministry's medical advisers had to consider whether adequate medical and nursing staff were available at the premises to ensure that treatment was given under proper supervision. If these conditions were fulfilled it was usual to recommend approval to acquire the apparatus provided alternative facilities for the treatment were not readily available.

Labour Managers and Welfare Officers

On September 23rd, Mr. Parker asked the Minister of Labour whether, arising out of the discharge of a labour manager from the General Electric Co., at Wembley, the National Service Officers and Appeal Boards had been instructed, when dealing with cases concerning works managers, labour managers or welfare officers, to take into account not only the responsibility of these officials to the companies or organisations that employed them, but also the general welfare of the community and the employees under their control; and whether it was his policy to encourage a code of independent professional conduct among the officials in these positions.

Mr. Bevin said that national service officers were already instructed that labour managers and welfare officers should have the confidence both of the firm and of the workers. In his view, this was the only basis on which persons attempting to fulfil these functions could do so successfully and this fact was generally recognised by the members of the profession. He did not issue similar instructions to Local Appeal Boards but he had no doubt that the Boards had these considerations in mind.

Cycle and Torch Batteries

On September 23rd, Mr. Creech Jones asked the President of the Board of Trade whether he had any statement to make regarding the supply of cycle and torch lamp batteries for the use of the public.

Mr. Dalton said that a production programme providing for a substantial increase over last year, particularly in cycle lamp batteries, had been agreed with the Minister of Supply, who assured him that, subject to unforeseen circumstances, it would be met in full. But the Services' need for batteries was very great and civilians would help the fighting men, as well as themselves, by using torches only when really necessary. He must, however, warn the public that the supply of No. 8 batteries would be limited. If they used the larger torches, they would find that the batteries had a longer life.

Easing of Lighting Restrictions

In reply to questions, the Home Secretary has stated that he is satisfied that no general relaxation of the "black-out" is possible. The Government had twice investigated proposals for a higher standard of street lighting, to be extinguished by central control on alerts, but for various reasons this was not considered practicable. In the case of Blackburn where such a system had been applied it operated on an ordinary permitted "starlighting" installation and was accordingly "an unnecessary capitulation to black-out doctrine." Various modifications had been introduced and others would be made as circumstances warranted. They affected bicycle lamps, motor vehicles, lights in trains and passenger vehicles and at the larger railway stations. Pedestrians were now allowed to use undimmed torches, although the diameter of the aperture must still not exceed one inch.

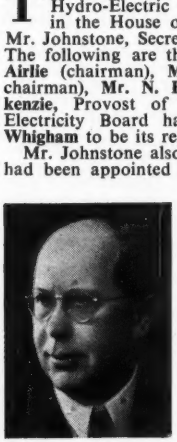
A number of steps to aid production in factories had been approved. In particular steps were being taken to replace permanent black-out by removable arrangements in a number of vital factories. Mr. Morrison said that it would not be in the public interest to give details of other measures but the policy was to work out the lighting required with the representatives of the vital industries concerned and to authorise for essential operations as much light as was consistent with the maintenance of a proper balance between the need for light and the risk involved.

PERSONAL and SOCIAL

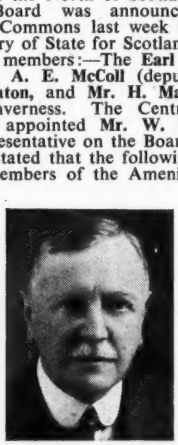
News of Men and Women of the Industry

THE constitution of the North of Scotland Hydro-Electric Board was announced in the House of Commons last week by Mr. Johnstone, Secretary of State for Scotland. The following are the members:—The **Earl of Airlie** (chairman), **Mr. A. E. McColl** (deputy chairman), **Mr. N. Beaton,** and **Mr. H. Mackenzie,** Provost of Inverness. The Central Electricity Board has appointed **Mr. W. K. Whigham** to be its representative on the Board.

Mr. Johnstone also stated that the following had been appointed members of the Amenity and Fisheries Committees:—Amenity Committee: Col. the Hon. Ian Campbell (chairman), Mr. J. Bowman, M.Inst.C.E., Mr. R. Hurd, Lady MacGregor of MacGregor and Dr. I. H. Maciver. Fisheries Committee: Col. Sir D. W. Cameron of Lochiel (chairman), Col. the Hon. Ian Campbell, Mr. W. Malloch, B.Sc., Mr. P. J. Robinson (former water engineer of Lanarkshire), and Mr. F. H. Williams.



Mr. A. E. McColl



Mr. W. K. Whigham

Mr. F. H. Williams

The Earl of Airlie is Lord Lieutenant for the County of Angus.

Mr. A. E. McColl, the deputy chairman, received his early technical education at the Glasgow and West of Scotland Technical College and Glasgow University and his early practical training at the yards of John Brown, Clydebank. He served as an assistant technical engineer with the Glasgow Corporation Transport Department. For several years he acted as chief executive officer with the Clyde Valley Electrical Power Co., and was closely associated with the design and development of the Lanarkshire Hydro-Electric Scheme, which was the first to be developed in Scotland for public supply purposes.

In 1927 when the Central Electricity Board was formed, Mr. McColl was the first Regional Officer to be appointed, the Central Scotland Scheme being the first area scheme to be created by the Board. He was responsible for the construction of the grid undertaking in Scotland and for the standardisation of frequency in the West of Scotland which had to be carried out before the Board's scheme could become effective as an operating unit. Mr. McColl's technical work has covered the development of many protective gear systems which are used all over the world for transmission lines, transformers and other electrical machinery. He is a past-chairman of the Scottish Centre of the I.E.E.

Mr. W. K. Whigham has been a member of the Central Electricity Board since its formation in 1927, and has been largely responsible for its financial affairs.

Mr. F. H. Williams B.Sc., M.Inst.C.E., M.I.E.E., is general manager and engineer of the Galloway Water Power Co. Before joining that company in 1934 he was with Merz & McLellan, Newcastle-on-Tyne, and previous to that he was in charge of the testing laboratory of the Manchester Corporation. Mr. Williams was chairman of the North-Eastern Centre of the I.E.E. for the 1933-34 session.

Mr. W. G. M. Hamilton has been elected a director of the London Electrical & General Trust, Ltd., and of the Atlas General & Industrial Investment Trust, Ltd.

Mr. R. C. Moore, traffic superintendent of the Liverpool Corporation Passenger Transport Department, has been recommended by the Sheffield Corporation Transport Committee for the appointment of deputy transport manager at Sheffield at a salary of £1,000 per annum.

Mr. J. H. Farthing has completed fifty years' service with the General Electric Co., Ltd., and has served on the board of directors for ten years. Dr. A. H. Railing and Mr. Leslie Gamage, managing directors of the company, recently presented him with a silver cigar box from the board of directors to mark the occasion.

Dr. A. H. Railing making the presentation to Mr. Farthing

Mr. Farthing has been the manager of the Lancashire and Yorkshire District since 1914 having been deputy manager since 1912. Since 1917 he has been a director of Salford Electrical Instruments, Ltd. He has spent 46 years in the Manchester district and was previously

in London. He has always taken a keen interest in the various trade organisations of the industry, and is chairman of the Manchester and District Committee of the Electrical Industries Benevolent Association and past chairman of the local committee of E.D.A.

Many messages of congratulation from friends in the electrical contracting industry were received by **Mr.** and **Mrs. F. E. Strange** on the occasion of their golden wedding. Mr. Strange (of Strange & Sons Electrical Engineering Co., Ltd.) is hon. secretary and treasurer of the Tunbridge Wells Branch of the Electrical Contractors' Association.

Mr. C. M. G. Evans, chief officer of H.M. Telegraph Ship *Alert,* and **Mr. E. Prince,** third engineer officer, have been awarded the M.B.E. for brave conduct and **Mr. F. S. B. Baldwin,** cable hand, has received the B.E.M.

The National Joint Committee of Local Authorities and Chief Electrical Engineers has approved a decision of the No. 7 District Committee concerning the salary of the chief engineer of the Kettering undertaking, **Mr. W. A. Walker.** The decision excludes from the unit assessment the supply to a very large consumer which is given under special arrangements between the Central Electricity Board and the Corporation. Instead of this special supply being taken into account in fixing the unit assessment a sum of £50 per annum is to be allowed.

In this issue the Kettering Borough Council asks for applications for the post of borough electrical engineer at a salary in accordance with the National Joint Committee scale. This is estimated to be £1,391 per annum and 85 per cent. is to be paid for the first year, 92½ per cent. for the second year and thereafter at the full scale rate.

Hackney Borough Council Establishment Committee has recommended the Council to confirm the appointment of **Mr. H. Stanley** as shift charge engineer and to promote **Mr. A. H. Reid** to a similar position.

Mr. H. B. Robin Rowell, a director of R. & W. Hawthorn, Leslie & Co., Ltd., has been elected chairman in succession to the late Mr. E. C. Straker. Mr. Rowell is also a director of other companies, including the North-Eastern Electric Supply Co., Ltd.

Captain K. Wilkinson, who for many years has been intimately concerned with the exploitation of both Morrison Electric and Electricar products, has recently joined the Q Vehicle Co., Ltd., as sales manager. He will be making his headquarters at 4, Dean's Yard, Westminster, London, S.W.1 (telephone: Abbey 2344/5).

"Night Must Fall," the successful stage and screen play by Emlyn Williams, was presented by members of the G.E.C. Dramatic Society in the Lecture Hall at Magnet House on the evenings of September 13th to 17th. Those who took part were Stanley C. Wells, Norah A. Symonds, Elsie Walbancke, John H. Kingdon-Rowe, Jessie C. Smith, Ella C. Barnett, Moyra Davies, Robert Scutt and William Peacock. The setting and stage direction were in the hands of Lewis A. Foster who was ably assisted by Edward W. Black. The production was by Marion I. Naylor.

The proceeds (about £125) will be devoted entirely to the G.E.C. Well Wishers' Club, which, as most people of the electrical industry know, provides comforts and parcels for members of the Magnet House staff now serving with the Forces.

Lord Southborough, who has been a director of the Westinghouse Brake & Signal Co., Ltd., since 1919 and chairman of the company since 1931, is retiring from the board at the end of the month. He is being succeeded by **Lord Herbert Scott,** who was appointed a director in 1935.

We reported in last week's issue that **Mr. A. C. Eborall,** M.Inst.C.E., M.I.E.E., chairman of British Brown-Boveri, Ltd., retired at June 30th last and that his services in an advisory capacity had been retained permanently by the company and for the time being he would remain on the board.

Mr. A. C. Eborall

Mr. Eborall (who is also a director of Bruce Peebles & Co., Ltd., and Richardsons Westgarth-Brown Boveri, Ltd.) was born in 1876. He obtained his technical education at Finsbury Technical College under Professors Silvanus P. Thompson and John Perry, and his practical training in the Swiss works of Brown Boveri & Co., while later, in electrical works in Cologne and Charleroi, he obtained valuable experience in design and manufacture. In 1899 he became technical manager of the engineering branch of Witting Bros., Ltd., which became Witting, Eborall & Co., Ltd., in 1903, and was acquired by Brown Boveri & Co. in 1906. He then became managing director of the new English subsidiary (now British Brown-Boveri, Ltd.) so that altogther his association with the Swiss concern extends to nearly forty years.

In the early years of this century Mr. Eborall did much to assist what was then a new development of the industry, *viz.*, the design and operation of polyphase machinery and apparatus, by giving numerous lectures and contributing papers to the Institution and articles to the technical Press. Although he specialised in polyphase work, his first paper (in 1895 to the I.E.E. Students Section) was on the subject of single-phase motors which were then struggling to take practical shape in the face of the difficulties inherent in the high frequencies (83 and 100 cycles) of nearly all the early AC supply systems.

Obituary

Dr. J. J. C. Bradfield, C.M.G., M.Inst.C.E., whose death is reported from Australia, was the designer of the Sydney Harbour Bridge and subsequently chief engineer. His other notable work included a report for the New South Wales Government upon the Sydney city and suburban electric railways and the design and supervision of the Sydney underground railway.

Mr. M. Kellow.—The death is reported, at the age of eighty-one, of Mr. M. Kellow, M.Inst.C.E., M.I.Mech.E., F.G.S. In his earlier days Mr. Kellow was interested in slate quarrying and was a pioneer in the introduction of electrical

methods to that industry, including arc-lighting, hauling and winding equipment. He was one of the earliest users of three-phase energy.

Mr. W. G. Moffatt.—The death took place recently in Belfast of Mr. William Glover Moffatt, at the age of seventy. Mr. Moffatt retired five years ago from the position of works superintendent with the Belfast Electricity Department. He was a Scotsman and went to Belfast about forty years ago.

Dr. F. J. W. Whipple, whose death occurred on September 25th, was superintendent of the Kew Observatory and assistant director of the Meteorological Office from 1925 to 1939. His special studies included investigations into the nature of the upper atmosphere and atmospheric electricity.

Mr. C. C. Abbott.—The death occurred recently at Pittsfield, Massachusetts, of Mr. Charles C. Abbott, who was formerly with the American General Electric Co. The *Electrical World* mentions that he received the Chas. A. Coffin Award in 1932 for his invention of the "Calrod" unit.

Mr. G. J. Millington, who died on August 28th at the age of seventy-six, was for many years managing director of the Universal Grinding Wheel Co., Ltd., Stafford.

Wills.—Mr. G. E. Taylor, A.M.I.E.E., governing director of G. E. Taylor & Co. (London), Ltd., who died on January 26th at the age of seventy-six, left £40,811 gross (net personalty £3,218).

Sir Horace Boot, M.Inst.C.E., M.I.E.E., M.I.Mech.E., the eminent constructional engineer, who died on March 31st, left estate valued at £390,947 (net personalty £367,238). He made a number of bequests, including £5,000 to the Institution of Civil Engineers, and £1,030 each to the Institutions of Electrical and Mechanical Engineers.

Fatalities

Linesman's Death.—A verdict that John Henry Sturman, aged thirty-three, a Norwich Corporation linesman, "died from injuries caused by falling from a ladder through accidentally contacting a live electric wire" was recorded at a resumed inquest last week.

Arthur Perry, mains assistant, stated that, having been informed of some faults on an H-pole, he instructed a linesman, Albert George Trett, to check up which pole it was and if it was one he could repair, to do it. The following morning he issued a permit to say that the line was safe between poles 28 and 42. As Trett was up a ladder he gave the permit to Riches, who sometimes acted as Trett's second mate, telling him to give it to Trett when he came down. Subsequently Trett told him that he had not seen the permit until after the accident.

In evidence, Trett said that he did not always hold a permit because he was usually working under a foreman. When there were men in different positions along the line he thought that more permits should be issued. While he was up one of the poles he saw Perry making out a permit which he thought was for the jointers. Perry later shouted to him to carry on straightening the H-pole.

Leslie William Riches said that when Perry handed him the permit he took it up the ladder to Trett, who was busy. Trett did not take it, but he understood him to say "All right." He put it in his pocket and did not think about it again until after the accident.

Damaged Meter Board.—An inquest was held at Whitby on a seven-year-old boy, John Robert Steyert, who received a fatal shock from an electric wire while playing in the West Pier Round House. Mr. J. W. Piggott, A.M.I.E.E., electrical engineer to the Urban District Council, said he found that the fuse box had been torn from the meter board. It was in such a state that it would have been "alive" when the boy touched it. When the use of the electrical equipment was discontinued the fuse box had been sealed. There were no connections and the box was covered with a plastic compound. Some force must have been used to tear the box from its housing. The gear was inspected two or three times a year; he had no knowledge that it was damaged. The coroner returned a verdict of "Accidental death."

Faulty Electric Iron.—While using an electric iron at her home at Penkridge, Mrs. Florence Millicent Wallace, aged thirty-one, received a fatal electric shock. At the inquest Mr. Percy Wardle, chief engineer of the Cannock U.D.C. Electricity Department, stated that there was a fault in the iron itself, and the earth wire was broken. Medical evidence was given that the shock would have been more severe because Mrs. Wallace was tired after a heavy day's wash and also she had her bare feet on a brick floor. The coroner returned a verdict of "Accidental death."

Electrified Pump.—Mr. James Sheen Marsh, aged thirty-six, a yard foreman at Messrs. Tremlett's tanneries, Exeter, received a fatal shock while working on a portable electric pump used to transfer liquid from one tank to another. At the inquest, when a verdict of "Death from misadventure" was returned, Mr. H. C. Flatman, works manager, said that he had received no complaints of bared wire on the pump. He agreed that the wire which caused the machine to become electrified could have been bared if it had fallen into the snip formed by the two flanged wheels of the primer. He did not know that the guard over the primer was partly broken away. There had been no general inspection of the machinery for some time owing to shortage of staff. Mr. W. A. Vivian (an Electrical Inspector of Factories) said that they were not trying to attach any blame to the factory because of faulty machinery.

Defective Lampholder.—While attempting to adjust a lamp used for lighting the inside of a bakery oven, Mr. Charles William Barbury, aged fifty, of Battersea, London, received a fatal electric shock. At the inquest it was stated that water dripping from a hole in the roof contributed to the accident. The lampholder, which was defective, had been dismantled but had apparently been repaired by someone. A verdict of "Accidental death" was recorded.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

The N.J.B. Schedule

I FULLY agree with all that "Fairplay" says in the *Electrical Review* of September 17th, regarding the inadequacy of the N.J.B. Schedule for staff employees of the industry. Being a keen E.P.E.A. member, I think the reason why the Schedule has not been revised is due in a large degree to the members themselves. The schedule has been altered to some extent, but what is wanted is a revised schedule and this is a big business. All the same, I am quite sure that if the members let their officials know, in no uncertain language, that they desire this reform, then providing the members play their part also, it can be done. Their part is to pay up subscriptions regularly, attend meetings and take a real live interest in the activities of their trade union.

To-day is a time of renascence in every way, and the E.P.E.A. will have to expand, or it will decline or be absorbed by a stronger union, therefore it is up to the members to formulate their policy and see that it is carried out. Provided there is a sound case, and determination, any injustice can be remedied. I think we have the former, so let us "GO TO IT!"

"BASE LOAD."

Starting Single-phase Motors

IN connection with Mr. B. Raynor's letter in your issue of September 24th, I would like to point out two important features in connection with the push-button shown in the circuit diagram.

The "start" button will be called upon to carry and break the starting winding current and since small push-buttons of the type which would be used on such a starter are designed to carry contactor coil control circuit currents only, the limit will be approximately 2·5 to 3 A. Thus, if this method of starting is used for any size of motor other than quite small fractional-HP machines, I can foresee trouble in a very short time with the push-button, even assuming that such a "start" button with the extra contact is available.

Moreover, if the "stop" button were used in the form shown it would be ineffective, so it must be connected between the lower contact of the maintaining interlock and the no-volt coil, as shown in the attached modified diagram herewith.

S. H. HARDING, A.M.I.E.E.

Westminster.

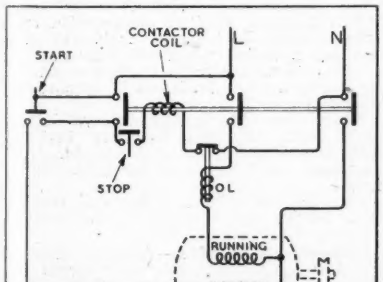


Diagram showing extra contact on "start" button connected direct to starting winding (corrected "stop"-button connections)

Supplies to Rural Areas

AMONG the problems of post-war development a prominent place must be given to the supply of electricity to rural areas, not merely as a social amenity but as a necessity for the development of agriculture. The cost of supply is, of course, very much greater than that prevailing in urban or thickly-populated areas, and if the whole of the additional cost had to be borne by the rural consumer it would be prohibitive. The question, then, is who should bear the additional burden and how is it to be shared?

This difference in cost is almost entirely in the fixed-charge component, the cost of energy itself being practically the same for all classes of consumers, and the chief elements are:—(*a*) Capital charges; (*b*) maintenance of the distribution system; and (*c*) transmission losses.

Dwellers in thickly-populated areas normally obtain their supplies much cheaper than those in more scattered districts which, of course, is some compensation for having to live there. Country life is, however, being shorn of many of its drawbacks, while still retaining its advantages. Improved transport facilities reduce the distance between the home and town, and the radio brings up-to-date entertainment into every home; a supply of electricity at a reasonable price will complete the picture. Since the problem is as much of a social as of an economic nature these points are not to be overlooked.

Transmission losses might well be borne borne by the rural consumer, but he certainly should be relieved of, at any rate, a considerable part of the costs under the other two headings. The part of which he is relieved

must be borne either by the taxpayer or by other consumers. The latter seems the more reasonable course, the only question being how the extra burden is to be apportioned. It has been suggested that supply undertakings should be reconstituted so that each one would embrace approximately the same proportion of urban and rural area. Since rural districts differ so widely in their characteristics, however, this suggestion does not seem to be practicable, and the following might, therefore, be considered as a basis for an alternative plan :—

Existing undertakers should each be allotted a certain rural area which they should be required to develop. Charges for supplies in this area should be the undertaker's normal tariff plus, say, 20 per cent. The expenses incurred in respect of capital charges and maintenance within that area, less the amount produced by the percentage addition, should be repaid to the undertaker from a central fund. This fund should be maintained by contributions from all authorised undertakers, calculated in somewhat the same manner as their contributions to the expenses of the Electricity Commissioners.

Standard national costs might be substituted for actual costs if thought desirable. This would considerably reduce the work of subsequent auditing, and would also encourage undertakers to be economical. Needless to say, costs would only be admitted in respect of works approved by the Electricity Commissioners, certified perhaps by the Central Electricity Board.

One other alternative is the nationalisation of the whole business of electricity supply, but as we seem to have an inherent, and perhaps not unreasonable, suspicion of nationalisation, it is doubtful whether this suggestion would be favourably considered.

Worcester. H. NEWTON PERKS.

Undue Preference

MR. E. W. DOREY, in the *Electrical Review* of September 24th (p. 402), gives charges that do not comply with suppliers' obligation under the equal charges clauses in the 1882 Act.

A supplier purchasing at C.E.B. transformers about three million kWh a year owns the underground cable, eight miles, which is tapped in his scheduled area at about seven miles and from which point electricity is distributed at 25 per cent. on rateable value and 2d. per kWh. At the 8-mile point it is distributed at 18 per cent. and ¾d. per kWh.

At a public inquiry the suppliers' solicitor "made a song" about his having £27,000 buried in that eight miles of cable and called attention to another company buying 2½ million kWh off the same C.E.B. transformers but having no investment in underground cable (*i.e.*, meters at nine miles from transformer fed through C.E.B. cable). He did not include in the song that the three millions cost ·53d. per kWh purchased, and the 2½ millions ·77d. per kWh an economy of £3,000 a year on the £27,000 investment.

I venture my opinion that until the Electricity Acts are amended to make it the specific duty of the Electricity Commissioners or other salaried officers to compel compliance with sections 19, 20 and 6 (*f*), redress will be wanting.

Herne Bay, Kent. THEODORE STEVENS.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, October 7th, 5.30 p.m. Inaugural address by the President, Col. Sir A. Stanley Angwin.

The New Zealand Centennial Medals awarded to members of the Institution and the certificates for premiums awarded for Session 1942-43 will be presented at this meeting.

Wireless Section.—Wednesday, October 13th, 5.30 p.m. Mr. T. E. Goldup's inaugural address.

Installations Section.—Thursday, October 14th 5.30 p.m. Inaugural address of Mr. A. G. Ramsey.

Measurements Section.—Friday, October 22nd, 5.30 p.m. Address by the chairman, Mr. E. W. Moss.

Mersey and North Wales (Liverpool) Centre.—Monday, October 4th, 5.30 p.m. Liverpool Royal Institution, Colquitt Street. Address by the chairman, Mr. T. E. Houghton.

Devon and Cornwall Sub-Centre.—Thursday, October 7th, 3 p.m. Royal Clarence Hotel, Exeter. Address by the chairman, Mr. Selwyn S. Grant, O.B.E.

North-Western Centre.—Saturday, October 9th, 2.30 p.m. Engineers' Club, Albert Square, Manchester. Chairman's address by Mr. C. T. S. Arnett.—*Wireless Group.*—Friday, October 15th, 6 p.m. Engineers' Club. Paper: "Wave Guides in Electrical Communication," by Mr. J. Kemp. *Students' Section.*—Saturday, October 16th, 1.15 p.m. Engineers' Club. Luncheon to be followed at 2.30 p.m. by address by the chairman, Mr. H. C. Parker, on "Is there a Future for Graduates in Synchronous Machine Design?"

Bristol Students' Section.—Friday, October 1st, 7 p.m. Merchant Venturers' Technical College. Address by the chairman, Mr. J. W. Dorrinton, on "Converter Substation Operation."

North-Eastern Centre.—Monday, October 11th. Neville Hall, Westgate Road, Newcastle-on-Tyne. Chairman's address.

University of London.—Tuesday, October 5th, 5.30 p.m. Institution of Electrical Engineers, Savoy Place, London, W.C.2. Last of three lectures on "Engineering Economics," by Sir Frank Gill, K.C.M.G., O.B.E.

Illuminating Engineering Society.—*South Wales Area.*—Thursday, October 7th, 5.30 p.m. (buffet tea, 4.45 p.m.). Mackworth Hotel, Swansea. Lecture on "Physiological Aspects of Lighting," by Dr. J. H. Shaxby.

COMMERCE and INDUSTRY

Income Tax Deduction. *Electricians Charged.*

"Pay as You Go" Taxation

FULL details of the Treasury scheme for deducting income tax from the current earnings of weekly wage earners are given in a White Paper (Cmd. 6469, Stationery Office, 4d.) issued last week. The proposals form the subject of a Bill which was introduced into Parliament on September 24th. At present the collection of tax lags ten months behind the receipt of wages so that should employment cease the employee remains liable for ten months' tax or if his wages are decreased he still has to pay on the higher scale for that period.

Under the new system the weekly deduction of tax will be automatically adjusted to any rise or fall of wages and at the same time the weekly deductions will be related to the final liability to tax on the aggregate wages for the whole year. The tax deducted from earnings in any financial year will represent the liability for that year, measured by actual earnings, and the deductions of tax week by week will keep pace with the accruing liability. Account will be taken week by week of the reliefs to which the employee is entitled. Arrangements are made for the partial refund of tax where the total liability for the year is reduced by a fall or cessation of wages.

The White Paper reproduces a "list of codes" for the settlement of allowances; examples of the tax deduction cards which employers will be required to keep in respect of their employees; notices of assessment, etc.

The Barrow Strike

A meeting of representatives of six of the trade unions to which the strikers at the Vickers-Armstrongs works, Barrow, belong (including the Amalgamated Engineering Union and the Electrical Trades Union) was held in Manchester last week. The meeting held that while the company and its representatives were responsible for the position to a certain degree the action of the unions' members was not calculated to secure the adjustment of their grievances. The strike arose out of the interpretation of the March award of the National Arbitration Tribunal which was to meet this week to give a decision upon the effect of the award.

It was stated this week that the interpretation of the award in the sense advocated by the strikers would mean an average increase of 7s. 6d. for a 47-hour week. The action of the Amalgamated Engineering Union in suspending the district committee of the Union for its unauthorised action has led to the resignation of the officials of all the fifteen branches of the Union in Barrow.

Industrial Law for Executives

The Industrial Welfare Society's correspondence course in industrial law has proved of great benefit to a large number of persons who have since the war been drafted into executive positions in industry and have required a working knowledge of industrial law but who could not afford to give a prolonged study to the subject. The course consists of six lectures, each of which can be read in 1 to 1½ hours, and students are invited to submit any questions they wish on the lectures. The lectures are normally sent weekly, but they can be sent all together or at longer intervals at the wish of the individual student. Particulars can be obtained on application to the Secretary, Industrial Welfare Society, 14, Hobart Place, London, S.W.1.

Brush-Metrovick Co-operation

The Brush Electrical Engineering Co., Ltd., and the Metropolitan-Vickers Electrical Co., Ltd., state that they have fused their interests in the battery electric vehicle industry. The Brush Co., which has had extensive experience over the last sixty years in the design and manufacture of bodies for passenger transport and other vehicles, has been taking a considerable interest in the electric vehicle industry. It has recently produced a 2-ton electric truck (see page 435) and has now further extended its interest in the battery electric field by acquiring the goodwill and business of the Vehicle Department of the Metropolitan-Vickers Co.

The Metropolitan-Vickers Co. will continue to manufacture the motors, controllers and electrical equipment, but the vehicle will be sold as the Brush electric vehicle. The future responsibility for servicing existing Metropolitan-Vickers vehicles will fall upon the Brush Co.

It is hoped that the permission of the Ministry of War Transport and the Ministry of Supply will be received to enable a limited number of new vehicles to be produced from the existing stock of parts during the war years, for the use of private customers.

Alleged Conspiracy to Defraud

At Aylsham (Norfolk) on September 14th nine electricians and electricians' mates were charged with conspiring together to defraud their employers, Powell & Lee, Ltd., of Vauxhall Road, London, S.W.1. The managing director of the company, Mr. G. R. Powell, said that the men were engaged on two Government sites in Norfolk. Their time sheets were made up each Wednesday, although, to catch the London post, they were filled in before the completion of the day's work, adjustment being made later.

Another director, Mr. W. E. Eglington, said that during a visit to Norfolk he saw a lorry carrying a number of his workmen at between 5 and 5.15 p.m. on February 16th. Later he saw a second lorry also carrying some of the men employed by the company. On the two following days he again saw the same thing happening, and on February 20th he found that the men had left the sites at 3 and 3.30 p.m. respectively and on the 22nd they did not start work until 10 a.m. (one of them at 1 p.m.).

Evidence was given corroborating Mr. Eglington's statements. A witness also stated that the defendants used to take turns in going home for week-ends and he had heard them say that they booked the time that they were away.

An Irish labourer who was said to have made

a statement to the police refused to give evidence and was sentenced to seven days' imprisonment.

A detective stated that he had seen one of the defendants at his lodgings and he admitted that he had booked time when he had not worked; it was a regular practice among the men to book a little more time than they had actually worked. Similar evidence was given with regard to another of the defendants.

The accused men reserved their defence and were committed for trial at the next Norfolk Assizes, bail being allowed.

Alleged Breach of Regulations

At the West Ham Police Court on September 22nd, Associated London Flour Millers, Ltd., were summoned for an alleged breach of the electricity regulations under the Factories Act. It was stated for the prosecution than an employee of the company was cleaning a switchboard when the lamp which he was using came into contact with an unprotected part of "live" apparatus as a result of which he sustained severe burns.

For the defendants, who pleaded guilty, it was stated that the board had been erected by a well-known firm of engineers and had been in use without mishap for ten years. It seemed that the man placed his lamp at the top of the board where he had no business to put it. Steps had been taken to prevent any recurrence of the accident.

The summons was dismissed upon the payment of 10 guineas costs.

Reinstatement of an Employee

We reported in our issue of August 20th (p. 242) that C. V. A. Jigs, Moulds & Tools, Ltd., had been fined £25, with five guineas costs, for failing to reinstate a timekeeper when ordered to do so by a National Service Officer. It was alleged that the employee had been dismissed for serious misconduct which included the striking of a superintendent who had complained of his work. The employee appealed to the Local Appeal Board which decided that the case would have been met by three days' suspension, whereupon the National Service Officer directed the company to reinstate the employee. The case arose out of the company's refusal to do this.

On September 21st the East Sussex Appeal Committee heard an appeal by the company against the magistrates' decision. The appeal was dismissed but the chairman of the Committee (Mr. Justice Cassels) strongly criticised the Appeals Board and the National Service Officer. He considered that the Board should have adjourned the hearing of the employee's appeal when it was told that an action for assault was being taken against him. At the same time the company's case had been mishandled by its representative who declined to call evidence when the adjournment was refused. Mr. Justice Cassels thought that the Board should have adjourned the hearing instead of giving a decision on inadequate evidence. Then the National Service Officer proceeded to put into operation his enormous powers, almost the powers of a dictator, without making further inquiry or going out of his way to see whether the Board had heard both sides.

Nevertheless, the appeal had to be dismissed for unfortunately the law was against the company. There could be no appeal against the Local Appeal Board or the direction of a National Service Officer. There had been a direction and it had not been complied with and that concluded the matter so far as the Committee was concerned.

E.A.W. Visit Finchley

A visit was recently made to Finchley's four Civic Restaurants by twenty-five delegates of the Electrical Association for Women. The Mayor of Finchley (Councillor the Rev. W. L. Brooksbank) and Alderman C. S. Syrett (chairman of the Communal Feeding Committee) received them. Mrs. Walker, who is in charge of British Restaurants in the London area, was also present. The visitors were conducted on their tour by Mr. C. Bradley (deputy communal feeding officer) and Miss Gameson. The chief object of the visit was to inspect the vegetable cooking in the four Finchley restaurants. After inspecting the Hamilton, the Gainsborough and the Essex, they sat down to lunch at the Park. The delegates are all domestic science trained members and their duties include advising canteen staff on large-scale cookery.

A discussion took place on large-scale vegetable cookery and the visit provided practical information on the subject following the instructive lectures of the previous day. Miss Sally Walker (British Restaurant adviser, Ministry of Food), Miss Margaret Eaves (housecraft lecturer to the E.A.W.), and Miss Gameson and Mrs. Williams (assistants to the communal feeding officer, Finchley) took part in the discussion.

Lamp Publicity

An interesting feature of the 1943-44 lamp publicity campaign of Crompton Parkinson, Ltd., is the proposed use of posters for the display of which selected areas have been arranged in groups in such a manner as to tie up with an extensive use of advertising in newspapers and the trade Press. To augment the publicity

"I'VE GOT A BRIGHT IDEA"
"YES, I'VE GOT CROMPTON LAMPS TOO!"
You need a good light.
The War factories do, too. So if the first shop doesn't happen to have the size of Crompton Lamp you want, the next shop probably has.
BE BRIGHT...
SAY CROMPTON

afforded by these posters, Crompton lamps will be further advertised by the exhibition of painted signs at important railway terminal stations, so that the 'man in the street,' whether bent on business or pleasure will continually have before him announcements as to the type of lamp which will afford good lighting, while observing the need for saving fuel.

In the matter of window display material, due to the success achieved during the last season it has been decided to continue the issue of the attractive modelled pieces which were specially designed for both Crompton and Kye lamps. To link up this display advertising, extensive use is to be made of the national Press, and Provincial newspapers.

The Crompton tungsten, discharge and fluorescent lamps will be the subjects of the advertising which will be appearing as usual in the trade Press.

False Purchase-Tax Returns

At Coventry last week, Arthur Bernard Greenbaum (53), electrical wholesaler, of Leamington Road, Coventry, carrying on business at Coventry and Rugby, under the style of Green's Electrical Supplies, pleaded guilty to nine summonses for making false returns of purchase tax, one of keeping a false record of sales of chargeable goods, and one for making a false statement with intent to deceive.

Mr. R. L. Fisk, for the Customs and Excise, said that defendant collected purchase tax on goods sold by him, amounting to £4,943, of which he had only paid £447 to the Government. When interviewed, he produced five invoice duplicate books, which the prosecution alleged had been deliberately falsified in order to cover the deficiency. Forty-eight other duplicate invoice books were found, and the total deficiency of purchase tax was £4,016 for the recovery of which a writ had been issued in the High Court.

Mr. A. P. Marshall, for the defence, said that defendant was educated at University College, London, with the intention of entering the Jewish ministry. In 1910 he had a breakdown, and was an inmate of Bethnal Green Mental Hospital for eight months. He served in the R.N.V.R. until 1917, and later he spent fourteen months in a mental hospital at Denmark Hill, London. In 1936 he started his present business. He had no business training and the more the business grew, the greater the muddle his accounts became. Another misfortune was the destruction of stock valued at £830 when his premises at Coventry suffered from enemy action in February, 1941.

Defendant was sentenced to twelve months hard labour, and fined £250, with £150 costs, or a further three months imprisonment in default.

Rubber After the War

In an address before the New York Chamber of Commerce recently, Mr. J. L. Collyer, president of the B. F. Goodrich Co., reviewed the present situation and future possibilities in the matter of natural and synthetic rubber. As quoted by *The Times*, he said that after the war the potential production of rubber would be 2,700,000 tons a year, of which 1,000,000 would represent various kinds of synthetic rubber. This would be considerably more than twice the amount of rubber ever used before; in 1939-41 the average absorption was about 1,100,000 tons a year.

Mr. Collyer thought, however, that this expanded output could be absorbed in a reasonable time if prices were low enough. To illustrate the possibilities he said that before the war the consumption of rubber per head in the United States was 10 lb. per annum. In Russia it was only one-third of a pound and in China three-hundredths of a pound. Even a slight increase in these figures would mean a big rise in the demand.

In the early post-war years the synthetic rubber plants in the United States, which had cost $650 millions, should be kept in operation on at least a limited basis, even if the cost of the product were to be rather higher than that of natural rubber. This would be in the nature of an insurance policy against high prices of natural rubber and moreover only by actual volume production would the cost of making synthetic rubber approach more nearly that of natural rubber. In this connection Mr. Collyer said that the cost of growing rubber and the law of supply and demand were not always the primary factors in setting the world selling price of crude rubber. This matter would have to be laid in the wider context of the Hot Springs meeting and the discussions now starting in the United States on the stabilisation of raw material prices before a solution of the problem was likely to become practical politics.

E.C.C. Jubilee

To mark the jubilee year of the Electric Construction Company, Ltd., Wolverhampton, as at present constituted, a presentation of National Savings Certificates was made at the works on Saturday to four employees, who have been with the company for 50 years or more. The recipients were James Lee (54 years); Edmund Smith (52 years); William Thomas Hughes (51 years); and Samuel J. Groom (50 years). The presentations were made by the manager, Mr. W. M. B. Furniss, and at the ceremony there were also present Mr. W. M. Furniss (managing director), Mr. W. Tonkinson (director and chief engineer) and other officials of the company.

Teachers in Technical Schools

The Executive Committee of the Federation of British Industries, recognising the importance of inquiries at present being undertaken by Sir Arnold McNair's Committee into the supply and the training of teachers, has passed a resolution emphasising the necessity of assuring a supply of teachers with technical knowledge, up-to-date industrial experience and ability to teach, for technical schools and colleges. It assures the McNair Committee of its most sympathetic consideration for any proposals calling for greater co-operation by industry in this matter.

Training of Engineers

On October 15th, the Brush Electrical Engineering Co., Ltd., is holding a one-day meeting at Loughborough with head masters and masters of the Leicestershire schools from which it draws most of its trade apprentices, to describe changes in its apprenticeship programme and to show them the new craft selection school.

Proposed Engineering Centre

In his presidential address to the Birmingham Electric Club last week Mr. A. M. Fletcher said that within the past few days he had received from one of the members proposals for a Birmingham Engineering Centre on a most ambitious scale, with a suggestion that the

Birmingham Electric Club should become the promoter of the enterprise. The proposal would be tabled at a Council meeting shortly and would be fully considered.

Transformer Restrictions

The Board of Trade has published the Electrical Transformers Order, 1943 (S.R. & O. 1943 No. 1353, Stationery Office, 1d.), which prohibits, as from September 30th, the manufacture, except under licence, of a prescribed range of electrical transformers otherwise than in accordance with certain provisions designed mainly to ensure the use of lower quality electrical sheet steel, reduce the number of sizes of transformers in the prescribed range, and eliminate certain non-essential features. This Order does not interfere with contracts made before September 30th.

Electricians' Wages

In dealing with the subject of wages in the electrical contracting industry in our last issue we stated that the weekly war addition was at present 17s. 11d. This was incorrect as the reduction from 18s. 4d. to 17s. 11d. which was to have come into operation in July and continued until October was suspended.

Post-War Transport

Writing in the *Passenger Transport Journal* recently, Mr. A. Hutcheon Spence, of the Dundee Corporation Transport Department, declared that one feature of the post-war world was a certainty, namely, the increased use of electric traction in the form of electric railways and trolley-bus services. The trolley-bus, he considered, must be regarded as a passenger transport vehicle possessing distinctive qualities for post-war needs. He gave the average pre-war price of a double-deck trolley-bus as £3,000, and in a subsequent issue of the same journal a contributor contended that the first cost must be reduced by abolishing some of the " frills."

Recovery of Redundant Cables

AT last Wednesday's meeting of the St. Pancras Borough Council the Electricity and Public Lighting Committee presented a report recalling that in March last the Committee considered a communication from the Electricity Commissioners, in which it was stated that the Commissioners had been asked by the Ministry of Supply to investigate the question of recovering redundant cables which would provide valuable scrap materials, particularly copper and lead, which were in very short supply. For this purpose, the undertaking was asked to furnish information of the approximate weight of copper and lead of any redundant cables in the ground, and the approximate cost of recovery. The information supplied indicated that, whilst the estimated value of the metal recoverable was £688, the cost of its recovery would be £1,259 or £571 over the value of the metal recovered. The Committee thereupon expressed its agreement with the recovery of the cable, subject to the Council not being involved in any loss.

The Ministry of Supply has since inquired (1) Whether the Council would be prepared to undertake on its own account the recovery of (a) All, or selected portions of the cable ; or (b) A portion of such cables, in which case the quantities of copper and lead involved should be stated. (2) In the event of the Council not being prepared to recover the cables on this basis, whether it would be prepared to carry out the work for the Ministry on an agency basis subject to an overriding limitation of expenditure of 20 per cent. above the value of the recovered materials.

These proposals were construed to mean that under the first suggestion the Council was asked to bear the whole cost of recovery, less the value of the metals recovered, or a loss of £571 ; and under the second suggestion, to accept the payment of the value of the metal, plus not more than 20 per cent. of such value towards the cost of recovery, which would mean a loss to the Council of £434. The Committee stated that it had advised the Ministry that it was not prepared to recover the redundant cables under either of the arrangements suggested, but that, fully appreciating the need at the present time for these valuable non-ferrous metals, it would be prepared to surrender the redundant cables, provided the Ministry would reimburse the Council the total cost of recovery.

N.Z. Centennial Medals

IN response to an invitation received from the President of the New Zealand Institution of Engineers, the Council of the I.E.E. has arranged for the presentation at the opening meeting of the session on October 7th, of the New Zealand Centennial Bronze Medals awarded to members of the I.E.E. for an address and a paper contributed by them to the proceedings of the New Zealand centennial celebrations held in 1940. Mr. W. J. Jordan, the High Commissioner for New Zealand, on the invitation of the President, has consented to present the medals.

The medals were awarded to Dr. A. P. M. Fleming, C.B.E., M.Sc., who was President of the Institution at the time of the celebrations, and whose address dealt with the subject of " The Influence of Research and Education on the Electrical Engineering Industry of Great Britain," and Messrs. H. W. Grimmitt, G. F. Shotter, E. Fawssett and Dr. H. G. Taylor, the joint authors of a paper on " Practical Aspects of Earthing." The presentation will take place prior to the delivery of Sir Stanley Angwin's inaugural address as President before which, as usual, the certificates in respect of the premiums awarded by the Council for papers read and published in the *Journal* last session, will also be handed to those authors who are able to attend.

Birmingham I.E.E. Luncheon

MR. D. KINGSBURY, chairman of the South Midland Centre of the I.E.E., is to deliver his address on Saturday, October 16th. As wartime conditions may prevent members living at a distance from attending all the proposed meetings during the session, it has been decided that this meeting shall take the form of a wartime lunch at the Grand Hotel, Birmingham. The new President, Col. Sir A. Stanley Angwin, has accepted the Committee's invitation to attend the luncheon and he will address the members.

Owing the catering restrictions attendance will be limited to 250 and members wishing to be present should apply to the hon. secretary for tickets (7s. each, exclusive of drinks) not later than October 9th.

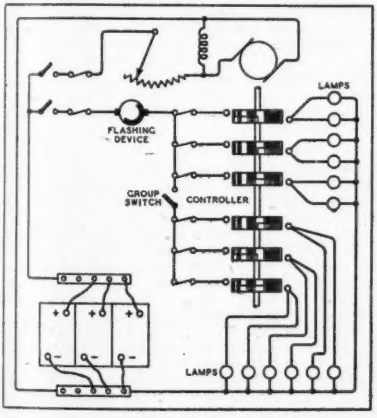
Mobile Traffic Signal

Automatic Electrically Operated Unit

A PORTABLE electrically operated automatic traffic controller has been designed by Mr. H. C. Busbridge, A.M.I.E.E., borough electrical engineer, Swinton and Pendlebury, with a view to economy and rapid placing in emergencies. The emergencies envisaged are:—Breakdown of existing permanent traffic-control installations, road reconstruction, traffic diversion necessitated by bomb damage or other causes and, in special cases, for taking the place of point-duty constables.

The signal turret is mounted on top of a light-gauge steel cabinet containing an automatic motor-operated controller of the Wardle-Bray type, except that the motor is designed for operation from a 6- or 12-V battery, also included in the cabinet. In addition to the conventional red, amber and green colour effects, the words "Stop," "Caution" and "Go" are painted or stencilled on the inside of the glass panels of the signal turret so as to be visible only when illuminated.

A flicker, obtained by means of an interrupter in the main feed to the signal lamps



Circuit diagram of automatic traffic control unit

and operated by the motor actuating the controller, halves the energy consumption. The flickering signal also emphasises the warning and prevents confusion with other lights in the vicinity.

By the operation of a group switch the

controller may be instantly converted for use on either a one-way or a two-way road junction and a further simple switching modification enables the unit to be converted to a flashing bollard using the amber signal only during night periods when traffic density is low.

The unit is mounted on a light four-wheeled chassis fitted with a locking device for the wheels and a removable drawbar for towing. The body and chassis are finished with an aluminium paint and trimmed with a row of cat's-eye reflector buttons around both top and bottom edges of the controller cabinet.

The batteries are of the ordinary vehicle starter type with an ampere-hour capacity that is determined by the number and candle-power of signal lamps in operation and the hours of duty, but any desired capacity can be obtained by plugging two or more starter batteries on to common busbars, thus enabling them to be changed quickly by one man without interruption of signal-operation.

For 12-V units of this type in parallel the following figures have been given by the Chloride Electrical Storage Co., Ltd. Using 24-W lamps, for twelve hours without flicker device and twenty-four hours with flicker, the requisite Ah capacity would be 96 and 156 Ah respectively.

The cost at any point would be considerably less than that of a permanent installation owing to the elimination of cable work in crossing to the various post signals.

Controllers of the type suggested could, it is considered, be manufactured for considerably less than £100 each, and the total operating cost, including attendance, would

not exceed £1 per week. As against probably not less than £10 for a continuously attended manual control.

It is possible that occasional damage may be sustained by signal units posted in the positions normally controlled by point-duty constables, due to the possibility of a skid, but it will be agreed that life is more valuable than property, and that in any case the risk would certainly be less than that involved by the presence of the island traffic bollards.

ELECTRICITY SUPPLY

Lighting in War and Peace. Derby Jubilee.

Bath.—MODIFIED LIGHTING.—The City Surveying Committee has agreed to install 100 "starlight" fittings on existing street lamp standards.

Belfast.—EXTENSION OF "STARLIGHTING."—At a recent meeting of the Police Committee it was decided that all the remaining electric lamps in the city, numbering about 300, should be adapted for modified lighting.

Birkenhead.—INCREASED SUPPLY.—The Electricity Committee is to provide an increased supply to Tragasol Products, Ltd., at Hooton, at a cost of £310.

Brighton.—HOSPITAL EMERGENCY LIGHTING.—The Health Committee has notified its desire to be associated with the Eastbourne and Hastings Corporations and the principal voluntary hospitals in the area in a scheme for adopting a generating set as a mobile power unit for emergency lighting in hospitals.

AIR-RAID WARNING SYSTEM.—In the course of a report to the Emergency Committee on air-raid warning systems, the borough electrical engineer referred to the desirability of its being wired separately from the street lighting system. The Committee decided to ascertain if the Regional Commissioner would sanction the expenditure of about £700 on wiring to enable the apparatus to be disconnected from the street lighting system.

Derby.—JUBILEE.—The completion of the electricity undertaking's fiftieth year of operation is being marked by an informal gathering at the showrooms at Iron Gate next Friday. The generating station will be open for inspection for which purpose parties will be formed at the showrooms at 2.30 p.m. Afterwards tea will be served at the showrooms.

Dundee.—PUBLIC *v.* PRIVATE SUPPLY.—A recommendation of the Hospitals Sub-Committee that electricity for the mental hospital at Westgreen should be taken from the Grampian Company in place of the present supply which is from private plant belonging to the hospital was recently discussed by the Public Health Committee.

Treasurer Caldwell, opposing the recommendation, said he was quite satisfied that they could produce electricity at a very much lower cost than the Grampian Company. He moved that Mr. P. Philip, the electrical engineer, and Mr. B. Cuthill, heating and mechanical engineer, should be asked to report on the possibilities of the production of electricity from steam plant at Westgreen and that the proposal to take a supply from the Grampian Company should be deferred pending the report.

Moving approval of the sub-committee's recommendation, the convener said that the present cost of generation for lighting at the institution was estimated at £550 per annum. For a similar supply from the Grampian Company the cost would be £250, an annual saving of £300.

The amendment moved by Treasurer Caldwell was carried.

Edinburgh.—STREET LIGHTING.—Subject to the approval of the Ministry of Home Security the Streets and Buildings Committee recommended a scheme of modified street lighting for central areas of the city. The streets in which it was proposed to introduce the lighting were Princes Street, Lothian Road, Earl Grey Street, Shandwick Place, Dalry Road, Gorgie Road, Leith Street, South Bridge, North Bridge, Nicolson Street, and Clerk Street. About 300 lamps would be needed.

On September 23rd, the Town Council discussed the recommendation. It was argued that the matter was one which outweighed financial and other considerations, and that the main achievement in securing a decision in favour would be to get the Ministry of Home Security to admit the principle, and when that had been got the results of experiments would be developed. Opponents of the proposal stressed the importance of getting the views of the service authorities before any decision was taken by the Council. It was also pointed out that for the extra lighting extra coal would be required at a time when coal stocks were short. On a division it was decided to refer the matter back to the Committee.

"FLOODLIGHTED" STREETS?—At the Streets and Buildings Committee meeting Councillor J. J. Robertson raised the question of post-war lighting, and suggested that it was time to consider an entirely new form of lighting for the city. Most people must have been struck, he said, by the effect in the streets of a searchlight in the sky. He thought some form of floodlighting was desirable. He moved that the question be remitted to the Lighting Sub-Committee to investigate, and this was agreed to.

According to the *Scotsman*, Mr. N. G. Wilson, the city's inspector of lighting and cleansing, stated in an interview that after the war "it might be possible to experiment with searchlights and balloons with mirror attachments to give a completely floodlit area."

Fort William.—BULK SUPPLY NEGOTIATIONS.—The Town Council recently suggested to the Lochaber Power Co. that an increased supply of electricity might be given to the burgh, and the question of charges was also raised. Sir William Murray Morrison, on behalf of the company, has pointed out that at the present time it would be impossible to increase the supply, as this would necessitate the installation

of further plant. With regard to price, he offered a reduction of 10 per cent. on the " unit " charge of ½d. He did not wish to close the door to further negotiations both as regards increased supplies of electricity and price, and he thought the Council might apply again when the present emergency was over. The Council at its last meeting accepted the reduction offered and thanked Sir Murray.

Glasgow.—SCHOOL LIGHTING.—The Education Committee has accepted an offer by the Electricity Department to install electric lighting at Penilee temporary school and air-raid shelters at a cost of £271.

London.—LOAN.—It has been reported to the Hammersmith Borough Council that the Electricity Commissioners have sanctioned the borrowing of £22,516 for the replacement and re-routing of three e.h.v. feeders.

Paignton.—POST-WAR LIGHTING.—The U.D.C. Highways Committee has decided that all necessary steps shall be taken to ensure complete lighting on the first night following the removal of black-out restrictions. Arrangements are to be made with the Paignton Electric Light & Power Co., Ltd., for the provision of temporary ordinary lighting in Totnes Road in place of the sodium lighting in view of the fact that sodium lamps will probably not be available for some time after the war.

Rochdale.—LOANS SOUGHT.—The Electricity Committee is seeking sanction to borrow £1,603 for substations, £2,576 for extensions to existing substations, £1,541 for replacement of gear and £1,800 for unspecified works.

Overseas

Australia.—BRISBANE SILVER JUBILEE.—This year the Brisbane City Council is celebrating the twenty-fifth anniversary of the establishment of a municipal electricity supply. In 1918 Mr. J. H. Hindman (who has been in charge of the electricity undertaking as general manager throughout the period) proposed that a supply should be provided in the suburb of Bulimba and from that small beginning the present extensive system serving Greater Brisbane has emerged. Other local councils grouped to form a joint electricity board which was taken over when the Greater Brisbane Council was constituted in 1926. Since then the number of consumers has risen from 24,000 to 66,000 and sales of energy from 7½ million to 82½ million kWh, states the *Electrical Engineer and Merchandiser*.

New Zealand.—HUTT VALLEY REPORT.—The 1942-43 report of Mr. E. F. Hollands, M.I.E.E., engineer and general manager of the Hutt Valley Electric Power Board, records that during the year a heavy southerly storm and two major earthquakes did considerable damage to consumers' service lines, but in no case was the main supply seriously affected. Statistics show that the E.P.B. serves 17,632 consumers in an area with an estimated population of 60,000. Last year sales per consumer rose from 3,661 to 3,875 kWh. The number of ranges connected at March 31st was 5,649, and water heaters 6,429. Total sales of electricity amounted to 68·3 million kWh. Incidentally, Mr. Hollands is to be congratulated on the promptness with which his report has been published in spite of staff shortage.

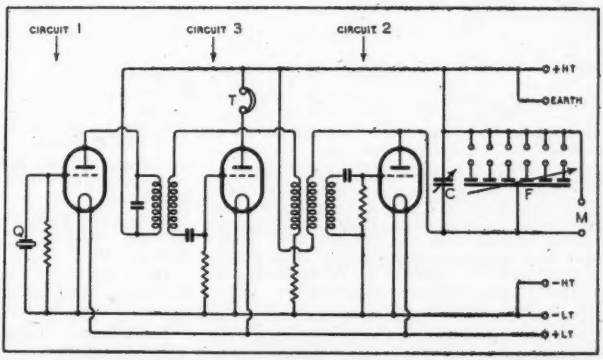
United States.—FOURTH SET AT GRAND COULEE.—It is reported in the *Electrical World* that the fourth 108,000 kW generating set at Grand Coulee Dam was placed in commission at the beginning of August. In addition there are two 75,000-kW sets transferred temporarily from Shasta Dam. Two further 108,000 kW sets are now being installed for service before next February and a seventh has been authorised.

Mr. H. W. Bashore, Commissioner of Reclamation, has pointed out that the new installation is especially important in view of the fact that the fuel oil shortage on the Pacific Coast may become critical and adversely effect the operation of standby plant. The possibility of a severe drought has also to be considered.

The present capacity of the thirty reclamation plants in the Western States is more than 1,950,000 kW which, with scheduled construction, will be raised to 2,500,000 kW by October, 1944.

The Dielcometer

Dr. H. S. Simons, who was a prominent collaborator with Professor L. Ebert in the development of the " Dielcometer " (not " Dielecometer ") described by Mr. J. H. Jupe in our issue of August 27th, has pointed out an error in fig. 1 of the article. There should be a connection from the lower side of the condensers C and F and from M to the — HT and — LT lines across the anode of the valve in circuit 2, as indicated in the revised diagram herewith. On p. 271, line 9, left-hand column, " steps " should read " step "; in line 3, right-hand column, 10.8 should read " 10."



FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Philco Radio & Television Corporation of Great Britain, Ltd., reports a profit for the year to April 4th of £107,728. From this has been appropriated £18,000 for N.D.C. and contingencies, which, with £678 for discount and premium on repayment of outstanding notes, leaves a balance of £89,050 to be carried forward.

In a statement issued with the report and accounts Mr. L. D. Bennett (chairman and managing director) says that since the close of the last financial year the company's business has been well maintained and throughout the group there has been considerable expansion in turnover. The directors will authorise the payment of a preference dividend on November 1st next, and under normal circumstances the ordinary shareholders can look forward to the early resumption of dividends upon their holdings. The bank overdraft has increased from £125,000 to £187,000 and at the date of the report has still further increased. The directors are keeping in mind the funding of this indebtedness.

Owing to the heavy losses which the present management took over, no substantial provision for income tax has yet become necessary. In future years this will take its place among the provisions to be made. For at least two years, as far as the directors can see at this time, no provision is expected to be necessary for E.P.T.

During this summer Mr. Bennett says he has had the opportunity of visiting the United States and the West Indies. While there understandings were arrived at with their associates, the Philco Corporation of Philadelphia, and others, on trading conditions, the widening of their technique, interchange of patents, etc., and these arrangements are matters which are now being brought to the stage of final agreement. They place great importance on these and other technical collaborative arrangements, associated as they are with the company's plans for extending research. They have developed a widening circle of associates in various directions, and after some years they have now arrived in a position for large developments.

Vactric, Ltd.—In the course of his speech at the annual meeting held on September 22nd, Sir Frederick Whyte (chairman) said that among the current activities of the company during the year the purchase of a second subsidiary company took an important place. It was the policy of the board to devote the entire resources and energies of the company to the war effort. They had in mind, however, the eventual reversion of the company to its normal civil activity, and they would take all necessary steps at the appropriate moment to resume their former service to the public.

Low Temperature Carbonisation, Ltd., reports a trading profit for the year ended March 31st of £164,798, an increase of £33,011 as compared with the previous year. The balance is struck after provision for a loss amounting to £50,692 by one subsidiary. It is explained that this loss was due to the undertaking being operated under Government direction for other war purposes, and together with previous losses due to the same cause, forms the subject of a claim. Interest and other income amounted to £1,911, making a total credit of £166,709. After deducting taxation, N.D.C., depreciation, debenture interest and directors' fees, the net profit is increased by £16,438 to £58,570. It is proposed to place £25,000 to taxation reserve, and to pay a dividend for the year of 4 per cent. (against 3½ per cent.). The balance carried forward is raised by £1,545 to £34,418.

The Midland Counties Electric Supply Co., Ltd., announces that it is paying an interim dividend on the ordinary stock of 3 per cent. (against 2½ per cent.). It is stated that the increase in the interim dividend should not be taken to indicate that there will be any increase in the total dividend for the year.

The Barcelona Traction, Light & Power Co., Ltd.—Presiding at the annual meeting in Toronto on September 21st, Mr. H. Speciael (president) said that there was a greater demand for power, but it had not been possible to take on the new load which was offered as the hydraulic situation was unsatisfactory owing to drought. In case of necessity, however, it was anticipated that coal for the steam plants would be provided although these were not operating due to the lack of coal at the present time.

The London Electrical & General Trust, Ltd., reports a net profit of £31,163 for 1942-43 (against £31,671). The final dividend is 3 per cent., again making 5 per cent. for the year. The valuation of investments is £1,090,150 against a balance sheet figure of £1,045,876.

The Madras Electric Supply Corporation, Ltd., reports that the result of the year's working does not permit of the payment of a dividend on the ordinary shares (against 4 per cent. for 1941).

Holophane, Ltd., reports a profit for the year to June 30th of £14,865, after providing £24,000 for tax. General reserve receives £15,000, and the balance carried forward is £6,651 (against £6,970 brought in).

Callender's Cable & Construction Co., Ltd., is again paying an interim dividend of 5 per cent. less tax.

Ransomes & Rapier, Ltd., are paying an interim ordinary dividend of 2 per cent., free of tax, as last year.

The Electrolytic Zinc Co. of Australasia has declared a final dividend of 5 per cent., again making 9 per cent. for the year.

The Paterson Engineering Co., Ltd., is paying a first and final dividend of 10 per cent., plus a bonus of 2½ per cent. (unchanged).

Ericsson Telephones, Ltd., is maintaining its interim dividend at 5 per cent., tax free.

Telephone Properties, Ltd., is to redeem the whole of its outstanding 6 per cent. first mortgage debenture stock at a premium of £2 per cent.

on December 31st next. At the end of last year this stock amounted to £120,419.

The **West London & Provincial Electric & General Trust** is paying an interim dividend of 2 per cent., less tax (unchanged).

New Companies

N. V. Electrical & Musical Instruments, Ltd.—Private company. Registered September 18th. Capital, £100. Objects: To carry on the business of manufacturers, importers and exporters of, and dealers in, wireless, telephone, television and electrical apparatus and components, gramophones, radiograms, musical instruments, etc. Directors: W. J. Taylor, 162, Hawthorne Road, Birmingham 23, and N. C. Sprason, 14, Stowell Road, Birmingham 22c. Registered office: 10, Aston Street, Birmingham 4.

Alexander Radio Co., Ltd.—Private company. Registered September 16th. Capital, £1,000. Objects: To carry on the business of retail and wholesale merchants, manufacturers and repairers of, and agents for, wireless and electrical apparatus and accessories, gramophones, etc. Jesse Bull, 4, Melthorne Drive, Ruislip, Middlesex, is the first director. Registered office: Devonshire Chambers, 146, Bishopsgate, E.C.2.

T. G. Henry, Ltd.—Private company. Registered September 14th. Capital, £2,000. Objects: To carry on the business of electrical, mechanical, motor and general engineers, engineering contractors and agents, wireless service agents, etc. Directors: I. Maynard, 41, Hartwood Road; G. Chandler, 36, Larkfield Lane; and A. A. Talbot, 7, Emmanuel Road, all Southport. Registered office: 14a, Bridge Street, Southport.

Metal Filter Co., Ltd.—Private company. Registered September 3rd. Capital, £2,000. Objects: To carry on the business of manufacturers of, and dealers in, air-conditioning, heating, cooling and refrigerating plant, etc. Subscribers: W. S. Taylor, 39, Grove Road, Leeds, and R. C. Munday, 69, The Turnways, Leeds. Solicitors: Simpson, Curtis & Co., Leeds.

Companies Struck Off the Register

The following companies have been struck off the Register, and are thereby dissolved :—Blandford Radio, Ltd.; Woodford Electrical Co., Ltd.

Companies' Returns

Statements of Capital

Electromobile Engineering Co. (West Bromwich), Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1942 (filed July 2nd, 1943). 482 shares taken up. £482 paid. Mortgages and charges: Nil.

F. J. Baynes & Co., Ltd.—Capital, £100 in £1 shares. Return dated April 1st, 1943. All shares taken up. £100 paid. Mortgages and charges: Nil.

Windermere and District Electricity Supply Co., Ltd.—Capital, £75,000 in 5,000 6 per cent. cumulative preference, 5,000 7½ per cent. non-cumulative preference and 5,000 ordinary shares, all of £5 each. Return dated April 6th. 5,000 6 per cent. preference, 4,000 7½ per cent. preference and 4,340 ordinary shares taken up, £23,850 paid on 3,040 6 per cent. preference and 1,730 ordinary shares. £42,850 considered as paid on 1,960 6 per cent. preference, 4,000 7½ per cent. preference and 2,610 ordinary shares. Mortgages and charges: Nil.

Electrical Appliances Guarantee Co., Ltd.—Capital, £1,000 in £1 shares. Return dated April 14th. 800 shares taken up. £800 paid. Mortgages and charges: Nil.

Electrical Manufacturers Finance Co., Ltd.—Capital, £150,000 in 150,000 shares of £1 each. Return dated March 12th (filed April 19th). All shares taken up. £150,000 paid. Mortgages and charges: Nil.

Bell Electric Lamp Co., Ltd.—Capital, £100 in £1 shares. Return dated December 31st, 1942 (filed April 22nd, 1943). All shares taken up. £100 paid. Mortgages and charges: Nil.

Telegraph Construction & Maintenance Co., Ltd.—Capital, £896,400 in £1 shares. Return dated May 4th. 454,425 shares taken up. £249,000 paid. £205,425 considered as paid. Mortgages and charges: Nil.

Simmonds & Stokes, Ltd.—Capital, £15,000 in £1 shares. Return dated March 16th, 1943. 10,204 shares taken up. £1,725 paid. £8,479 considered as paid. Mortgages and charges: £13,550.

Metropolitan-Vickers Electrical Co., Ltd.—Capital, £250,000 in £1 shares. Return dated March 25th, 1943 (filed August 19th, 1943). 10,002 shares taken up. £10,002 paid. Mortgages and charges: Nil.

Continental Hydro-Electric Co., Ltd.—Capital, £20,000 in £1 shares. Return dated May 6th, 1943. 5,000 shares taken up. £5,000 paid. Mortgages and charges: Nil.

International Hydro-Electric Development Syndicate, Ltd.—Capital, £10,000 in £1 shares. Return dated January 4th, 1943. 2,856 shares taken up. £2,856 paid. Mortgages and charges: Nil.

Increase of Capital

S. D. & S. Electrical, Ltd.—The nominal capital has been increased by the addition of £4,000 in £1 ordinary shares beyond the registered capital of £1,000.

Mortgages and Charges

Superlamp, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital (subject to certain mortgages), dated September 10th, 1943, to secure all moneys due or to become due from the company to Barclays Bank, Ltd., on any account whatsoever.

Bankruptcies

W. T. Dalton, 62, East Street, Horsham, Sussex, wireless engineer.—At the Court House, Brighton, recently, the above debtor was granted his discharge from bankruptcy. It was stated that the debtor was in a position to hand over £50 for the benefit of his creditors and he was willing to submit to judgment for the payment of a further £50 by instalments. The Judge granted the application subject to a further £50 being paid at the rate of £4 a month. The failure occurred in 1939.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets are handling a considerable volume of business, although this comes more to the specialised markets than in a general flow of orders to the House as a whole. Recently a lively speculation has sprung up in low-priced South African mining shares, the movement being very much in the nature of a gamble, fostered to some extent by encouragement from the Cape. In the purely industrial departments, investment of money goes on without intermission. Occasionally a line of shares or stock will come to market on account, as a rule, of a deceased holder, but apart from this source of supply, the shares available are, in many cases, scarce.

Transport "C"

Lively interest has revived in the "C" stock of the London Passenger Transport Board. Attention has been drawn to the stock on several suppositions. One, quoted here on a previous occasion, is that after the war, London Transport may be given the status of a quasi-official board, in which case the value of the "C" stock would be automatically enhanced. Another theory is that—again, after the war—the earnings of the Board will permit the payment of a substantially higher dividend than the present 3 per cent. on the "C", even if the full 5½ per cent., to which the stock is nominally entitled, is not paid. On the strength of these, and various other vague possibilities, the price of Transport "C" has been advanced to 69, accompanied by a good deal of business.

"War" Stocks

The successful progress of our American allies in the Southern Pacific has led to a demand for Perak Hydro-Electric shares; at 14s., the price is 2s. 6d. higher; and, paradoxical as it may appear, to this same cause is attributed an inquiry for Tokyo Electric sixes, which has raised the price 2 points to 24. The last payment of interest on these bonds, to British holders, was in June, 1941. Amongst other overseas issues, Madras Electric have fallen ⅛ to 22s. 6d. upon the passing of the dividend for the year. The previous dividend was 4 per cent. tax free, which went against 6 per cent. tax free in the year before. Other Indian shares show no change.

Price Fluctuations

Chief honours this week in the equipment and manufacturing group are secured by Callender's, 2s. 6d. up at 5½, and Aron ordinary, which have gained 2s. 3d. at 46s. 3d. Closely following, Metal Industries are 1s. 9d. higher at 43s. 9d., while Revo rose 1/16 to 40s., and Siemens 9d. to 35s. 6d. A large would-be buyer of Callender's at £5 per share had to turn away disappointed, and a fairly considerable parcel of Siemens shares that was tempted out by the rise, had no difficulty in finding a home. Associated Electrical ordinary advanced 1s. to 51s. General Electrics hold their last week's improvement to 91s. There are small reactions in British Insulated, Enfield Cables and Henley's.

Miscellaneous Matters

Veritys were the subject of a little business last week; the 5s. shares are quoted at 8s., at which price, on the 7½ per cent. dividend now being paid, the yield is £4 13s. 9d. per cent. on the money. India Rubber 5½ per cent. preference are 6d. easier at 21s. 6d. Price-changes in Home electricity ordinary shares are few and of no particular consequence. Electric Finance & Securities are 1s. higher at 53s., buyers being attracted by the relatively good yield offered by the shares. The Midland Counties Electric has declared an interim dividend of 3 per cent. against 2½ per cent. a year ago. But this, say the directors, should not be taken to indicate that there will be any increase in the total dividend for the year. The price is unchanged at 39s. 6d., which, on the 8 per cent. dividend generally paid, gives a return of £4 1s. per cent. on the money. The Brush Electrical Co. has acquired the goodwill and business of the vehicle department of the Metropolitan-Vickers Electrical Co., and the price of Brush shares rose 6d. to 8s. 6d. The market for radio shares has subsided into quietude. The Philco report had no effect upon the price, now at 14s. E.M.I. shares at 28s., and Cossor at 24s. 6d., are also unchanged.

Thorn Electrical

The present price of Thorn Electrical Industries, 21s. 9d., is the highest reached for a decade. During the interval, it has been down to 5s. 9d. in 1940, soon after the defection of France. The company has paid dividends of 20 per cent. per annum for seven years or more out of earnings that have ranged from 39 per cent. in 1940 to 64 per cent. in 1942. The company's capital is a modest £150,000, of which £50,000 is in 6 per cent. preference shares of £1 each, and £100,000 in 400,000 ordinary shares of 5s. each. Formed fifteen years ago, under the title of the Electric Lamp Service Co., Ltd., the company changed to its present name seven years ago. At the present price, the shares pay £4 12s. per cent. on the money.

Cable & Wireless

Prices of Cable & Wireless ordinary and preference stocks are holding the rises which they secured last week, the ordinary stock in particular being in steady demand from investment that looks for 5 per cent. on its

(*Continued on page* 454)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price Sept. 28	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	57/6	..	4 7 0
British Power and Light	6	7	32/6	..	4 6 2
City of London	7	7	28/–	..	5 0 0
Clyde Valley	8	8	39/6	..	4 1 0
County of London	8	8	40/6	–6d.	3 19 0
Edmundsons:					
7% Pref.	7	7	34/–	..	4 2 4
Ord.	6	6	28/6	..	4 4 2
Elec.Dis.Yorkshire	9	9	44/–	..	4 1 10
Elec. Fin. and Securities	12½	12½	53/–	+1/–	4 14 4
Elec. Supply Corporation	10	10	45/6xd	..	4 8 0
Isle of Thanet	Nil	Nil	17/6	..	—
Lancs. Light and Power	7½	7½	34/6xd	..	4 7 0
Llanelly Elec.	5½	6	25/6	..	4 14 1
Lond.Assoc.Electric	4	3	23/6	–6d	2 11 0
London Electric	6	6	26/6	..	4 10 7
London Power Red. Deb.	5	5	104½	..	4 15 7
Metropolitan E.S.	8	8	41/–	..	3 18 0
Midland Counties	8	8	39/6	..	4 1 0
Mid. Elec. Power	9	9	43/–	..	4 3 9
Newcastle Elec.	7	7	31/–	..	4 10 5
North Eastern Elec.:					
Ordinary	7	7	32/6	..	4 16 2
7% Pref.	7	7	33/6	–6d.	4 3 7
Northampton	10	10	47/6	..	4 4 *0
Notting Hill 6% Pref. (£10)	6	Nil	10	..	—
Northmet Power:					
Ordinary	7	7	38/–	..	3 13 8
6% Pref.	6	6	30/–	–6d.	4 0 0
Richmond Elec.	6	6	26/–	..	4 12 4
Scottish Power	8	8	38/–xd	..	4 4 4
Southern Areas	5	5	22/–	..	4 10 11
South London	7	7	26/6	..	5 5 8
West Devon	5	5	23/6	..	4 5 0
West Glos.	4½	3½	24/–	..	2 18 4
Yorkshire Elec.	8	8	41/–	..	3 18 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	6/6	..	—
Calcutta Elec.	7*	6*	39/–	..	3 1 6
Cawnpore Elec.	10	10	34/6	..	5 16 0
East African Power	7	7	33/6	..	4 3 7
Jerusalem Elec.	7	5	30/6	..	3 5 7
Kalgoorlie (10/–)	5	5	10/–	..	5 0 0
Madras Elec.	4*	Nil	22/6	–¼	—
Montreal Power	1½	1½	29	..	5 1 8
Palestine Elec."A"	4*	5*	42/–	..	2 7 8
Perak Hydro-elec.	6	7	14/–	+½	—
Shawinigan Power	83cts.	90cts.	19	–½	—
Tokyo Elec. 6%	6	6	24	+2	—
VictoriaFallsPower	15	15	4⅛	..	3 9 7
Whitehall Inv.Pref.	—	—	25/–xd	..	4 0 0

Company	Dividend Previous	Dividend Last	Middle Price Sept. 26	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence)	—	3	99½	..	3 0 4
1955–75	5	5	113½	..	4 8 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	102	..	3 8 8
1974–94	3½	3½	100	..	3 5 0
LondonElec.Trans. Ltd.	2½	2½	97	..	2 11 3
London & Home Counties 1955–75	4½	4½	111	..	4 1 1
Lond.Pass.Trans.:					
A	4½	4½	115½	–1	3 18 0
B	5	5	115½	..	4 6 7
C	2⅞	3	69	+2	4 7 0
WestMidlandsJ.E.A. 1948–68	5	5	109	..	4 11 9
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	116	..	5 3 4
Def.	1½	1½	27½	..	5 9 1
Anglo-Portuguese	8	8	24/–	..	6 13 4
Cable & Wireless:					
5½ Pref.	5½	5½	113	..	4 17 3
Ord.	4	4	78	..	5 2 7
CanadianMarconi	$1 Nil	4cts.	9/6	..	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	37/–	..	2 14 1
Pref.	6	6	28/–	..	4 5 9
Great NorthernTel. (£10)	Nil	Nil	23	–1	—
Inter. Tel. & Tel.	Nil	Nil	17	..	—
Marconi-Marine	7½	7½	32/9	..	4 11 7
Oriental Tel. Ord.	16	10	45/–	..	—
Telephone Props.	6	Nil	14/6	..	—
Tele.Rentals (5/–)	10	10	11/–	..	4 11 0
Traction and Transport					
Anglo-Arg.Trans.:					
First Pref. (£5)	Nil	Nil	3/6	..	—
4% Inc.	Nil	Nil	11	..	—
Brit.Elec.Traction:					
Def. Ord.	45	45	1125	..	4 0 0
Pref. Ord.	8	8	175	..	4 11 5
Bristol Trams	10	10	51/–	..	3 18 6
Brazil Traction	$½	$1	29½	..	—
Calcutta Trams.	5½	6½	41/–	..	3 3 5
Cape Elec. Trams	5	6	24/–	..	5 0 0
Lancs. Transport	10	10	44/3	..	4 10 4
Mexican Light:					
1st Bonds	5	5	107½	..	4 13 0
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd.	5	5	75½	..	6 12 4
5% Pref.	5	5	108	–½	4 12 7
T. Tilling	10	10	56/6	+1/6	3 10 6
West Riding	10	10	43/–	..	4 13 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Sept. 28	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron. Elec. Ord. .	7½	10	46/3	+2/3	4 6 7
Assoc. Elec. :					
Ord.	10	10	51/–	+1/–	3 18 6
Pref.	8	8	38/–	..	4 4 3
AutomaticTel.&Tel.	12½	12½	59/–	+1/–	4 4 9
Babcock & Wilcox	11	11	46/9	–9d.	4 14 0
British Aluminium	10	10	47/3xd	..	4 4 9
British Insul. Ord.	20	20	5 ⅞	– ⅛	3 12 2
British Thermostat (5/–)	18½	18½	19/–	..	4 17 4
British Vac.Cleaner (5/–)	15	30	27/6	–6d.	5 9 1
Brush Ord. (5/–)	6	8	8/6	+6d.	4 14 2
Burco (5/–) ..	15	15	15/9	..	4 15 3
Callender's ..	15	20	5½	+½	3 18 2
ChlorideElec.Storage	15	15	82/6	..	3 13 0
Cole, E. K. (5/–)	7	10	25/–	–6d.	2 0 0
Consolidated Signal	17	24	5¾	..	4 3 6
Cossor, A. C. (5/–)	7½*	10*	24/6	..	2 1 9
Crabtree (10/–) ..	17½	17½	39/–	..	4 9 9
Crompton Parkinson Ord. (5/–) ..	20	20	26/–	..	3 17 0
E.M.I. (10/–) ..	6	6	28/–	..	2 2 10
Elec.Construction	10	12½	50/–	..	5 0 0
Enfield Cable Ord.	12½	12½	58/–	–6d.	4 6 2
English Electric. .	10	10	48/–	..	4 3 4
EnsignLamps(5/–)	25	25	22/6	..	5 11 1
Ericsson Tel. (5/–)	22*	20*	53/–	..	1 17 9
Ever Ready (5/–)	40	40	40/6	..	4 18 9
Falk Stadelmann	7½	7½	32/–	..	4 13 9
Ferranti Pref. ..	7	7	29/6	..	4 15 0
G.E.C. : Pref. ..	6½	6½	32/–	..	4 1 3
„ Ord. ..	17½	17½	91/–	..	3 17 0
Greenwood&Batley	15	15	42/6	..	7 1 2
HallTelephone(10/–)	12½	12½	25/6	..	4 18 0
Henley's (5/–) ..	20	20	25/–	–6d.	4 0 0
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	17½	63/6	..	5 10 3
India Rubber Pref.	5½	5½	21/6	–6d.	5 2 1
Intl. Combustion	30	30	6¼	..	4 17 10
Johnson & Phillips	15	15	70/–	..	4 5 9
LancashireDynamo	20	22½	92/9	..	4 17 0
Laurence,Scott(5/–)	15	12½	12/–	..	5 1 2
London Elec.Wire	7½	7½	32/6	..	4 12 3
Mather & Platt ..	10	10	52/6	..	3 16 0
Metal Industries(B)	5	8	43/9	+1/9	3 13 2
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	5¼	..	3 18 0
Pye Deferred (5/–)	25	25	25/–	..	5 0 0
Revo (10/–) ..	17½	17½	40/–	+⅛	4 7 6
Reyrolle , ..	12½	12½	70/–	..	3 11 5
Siemens Ord. ..	7½	7½	35/6	+9d.	4 4 6
Strand Elec. (5/–)	4	7½	7/3	..	5 3 5
Switchgear&Cowans (5/–) ..	10	20	18/–	..	5 11 1
T.C.C. (10/–) ..	5	5	20/–	..	2 10 0
T.C. & M. ..	10	10	53/–	..	3 15 6
TelephoneMfg.(5/–)	9	9	12/–	..	3 15 0
Thorn Elec. (5/–)	20	20	21/9	..	4 12 0
Tube Investments	20	20	93/–	..	4 6 2
Vactric (5/–) ..	Nil	Nil	13/9	..	
Vickers (10/–) ..	10	10	19/6	..	5 2 7
WalsallConduits(4/–)	55	55	44/–xd	+6d.	5 0 0
Ward & Goldstone (5/–)	20	20	26/–	..	3 17 0
WestinghouseBrake	10	12½	66/3	..	3 15 6
West, Allen (5/–)	7½	7½	7/3	..	5 3 5

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 452)

money from a stock which, standing well under par, has a reasonable prospect of appreciation in the post-war period. The argument is sometimes advanced against Cable & Wireless ordinary that the use of cables for transmission of messages has been largely superseded by wireless means of communication, and that after the war a good part of the material of Cable & Wireless will be found obsolete. Some of it no doubt will have been destroyed by enemy action. The argument would carry greater weight were it not for the known fact that Cable & Wireless is making full use of the latest and most up to date developments in wireless communication. A few weeks ago, the combine was advertising the enormous amount of traffic passing through its hands, and this in itself imparted confidence to the investor who is interested in the ordinary stock. The preference stands on a different plane, and its security is regarded as sufficiently sound for the stock to be recommended as an investment yielding £4 17s. 6d. per cent. Admixture of the two, preference and the ordinary, will give an average return of 5 per cent. on the money. Great Northern Telegraphs have been dull of late, owing to the company being of Danish origin; the price has slipped back to 23.

Crompton Parkinson

The financial year of Crompton Parkinson, Ltd., ends this week (September 30th), and the final dividend for the year should be declared early in December. An interim dividend of 7½ per cent. was paid last May. It is assumed that the dividend for the full year will be made up to 20 per cent. as usual. At the present price of 26s., Crompton Parkinson ordinary 5s. shares give a return of no more than £3 17s. per cent. The shares are remarkably well held, and the 20 per cent. dividend has been paid for years past out of earnings very considerably more than the rate distributed. The company, as is well known, carries on business as electrical engineers and manufacturers of heavy electrical equipment with works in this country, in New South Wales, India, and other places. The nominal capital of £2,000,000 is nearly all issued, slightly more than half being in " A " ordinary shares and stock, in 5s. units. There are 600,000 ordinary shares and stock, but it is in the "A" ordinary in which the freer market exists.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

BABCOCK & WILCOX, LTD.—" Tubulous vapour generators." 3031/42. June 14th, 1941. (555911.) " Vessels adapted to withstand internal fluid pressure and in the manufacture of such vessels." 3032/42. May 17th, 1941. (555912.)

R. E. Beswick, A. G. E. Beswick and W. F. Melbourn.—" Cartridge fuses." 3544. March 17th, 1942. (555767.) " Fusible elements for cartridge fuses." 3545. March 17th, 1942. (555768.) Ditto. 3546. March 17th, 1942. (555769.)

Birmingham Electric Furnaces, Ltd., and J. Harris.—" Furnaces for the heat-treatment of materials." 3020. March 7th, 1942. (555814.)

British Thomson-Houston Co., Ltd.—" Surface type heat-exchangers." 18513/42. January 1st, 1942. (555784.) " High-frequency apparatus embodying electron discharge tubes." 5344/41. April 25th, 1940. (555825.) " High-frequency electron discharge apparatus." 9439/41. July 26th, 1940. (Addition to 541271.) (555827.) " High-frequency electric apparatus." 17164/40. November 30th, 1939. (555863.) " High-frequency electric apparatus." 17165/40. November 30th, 1939. (555864.) " Electrical voltage regulating systems." 3126/42. March 12th, 1941. (555917.) " Valves." 10053/42. July 22nd, 1941. (555923.)

British Thomson-Houston Co., Ltd., W. J. Scott, H. R. Ruff and M. Monk.—" Thermostatic electric switches." 8797. June 26th, 1942. (555892.)

Budd Induction Heating, Inc.—" Electrical inducing coils." 13221/42. September 19th, 1941. (555902.)

Cinema-Television, Ltd., and S. S. West.—" Connectors for electric cables and the like." 4345. April 1st, 1942. (555770.)

J. A. Crabtree & Co., H. F. McLoughlin, W. E. Hill, R. W. Morgan and T. D. G. Wintle.—" Terminal ends of electric conductors." 3502. March 17th, 1942. (555836.)

Dubilier Condenser Co. (1925), Ltd. (W. Dubilier).—" Manufacture of electrical condensers." 3080. March 9th, 1942. (555914.)

B. Erber.—" Electronic valves and capping arrangements therefor." 3451. March 16th, 1942. (555918.)

Ferranti, Ltd., and E. S. Cluderay.—" Aircraft instruments." 5081. April 19th, 1941. (555883.)

Ferranti, Ltd., and F. L. Humber.—" Electric resistance heating elements." 8213. June 12th, 1942. (555883.)

H. J. C. Forrester (Hydraulic Development Corporation, Inc.). — " Electrical control systems." 15998. November 12th, 1942. (555927.)

Franco-British Electrical Co., Ltd., and A. H. Brackensley.—" Light reflecting devices." 4213. March 30th, 1942. (555841.)

General Electric Co., Ltd., and E. Friedlander.—" Mercury arc convertors with interrupted jet ignition." 8430. June 19th, 1942. (555884.)

Hercules Powder Co.—" Electrical insulating material and method of making the same." 14582/41. April 18th, 1941. (555904.)

Hoover, Ltd.—" Suction cleaners and the like." 2929/42. March 17th, 1941. (555808.)

Hoover, Ltd., C. B. Colston and H. G. Dunn. —" Rotary electric transformers." 2928. March 6th, 1942. (555807.)

Marconi's Wireless Telegraph Co., Ltd.—" Mounting of piezo-electric elements." 9109/42. July 1st, 1941. (555779.) " Frequency-modulation convertors." 6575/42. May 15th, 1941. (555857.)

G. D. Page.—" Electric torches." 2975. March 6th, 1942. (555910.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). — " Cathode-ray tube device for generating high-frequency oscillations." 13659. October 23rd, 1941. (555790.)

Rotax, Ltd., and A. Massey-Allen.—" Transformers for spark ignition apparatus." 3011. March 7th, 1942. (555835.)

W. Schrader. — " Domestic refrigerators." 8162. June 15th, 1942. (555882.)

B. Schwarz.—" Operation and control of AC commutator motors." 3513. March 17th, 1942. (555838.)

W. Scott.—" Centrifugally operated switches for electric motors." 8695. June 24th, 1942. (555890.)

P. A. Sporing, C. P. Johnson and Telegraph Condenser Co., Ltd.—" Electric terminals." 5596. April 27th, 1942. (555876.)

Standard Telephones & Cables, Ltd.—" Television scanning systems." 7007/42. June 6th, 1941. (555773.) " Radio compasses." 2808/42. March 5th, 1941. (555803.) " Radio direction finders." 2810/42. March 6th, 1941. (555834.) " Noise reduction signalling system." 4156/42. November 1st, 1940. (555840.) " Means for adjusting inaccessible elements." 7004/42. May 31st, 1941. (555879.) " Frequency of phase modulation of a carrier wave." 15265/42. November 4th, 1941. (Addition to 551282.) (555925.)

Standard Telephones & Cables, Ltd., B. B. Grace and L. H. Webb.—" Wound coils for electrical purposes." 2951. March 6th, 1942. (555811.)

Standard Telephones & Cables, Ltd., H. Wolfson and S. C. Shepard.—" Coating metals with carbon." 12502. September 26th, 1941. (555828.)

F. W. Thorpe, Ltd., and F. W. Thorpe.—" Reflectors of tubular horizontal electric lamps." (Cognate applications 5511/42, 12126/42 and 14449/42.) April 24th, 1942. (555849.)

United-Carr Fastener Corporation.—" Electrical contacts of the socket type." 8588/42. July 17th, 1941. (555922.)

F. West, jun.—" Telemetric systems." 11666. September 11th, 1941. (555788.)

Amended Specification

547665. Standard Telephones & Cables, Ltd., and others.—" Arrangements for indicating a characteristic of an alternating current electric supply system."

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—COMMONWEALTH.—P.M.G.'s Department. October 21st. Lamps and sockets. Sch. C.4196.

NEW SOUTH WALES.—Sydney County Council. November 25th. Automatic voltage regulating equipment for generator No. 10, at Bunnerong power station. Spec. 666, Comptroller of Stores.

Orders Placed

London.—Metropolitan Water Board. Accepted. Six-ton petrol electric mobile crane (£1,330).—Ransomes & Rapier. Installation of electric power and lighting at Kew Bridge (£410).—Smith & Hammond. Electric motor for Nunhead works (£51)—Electric Construction Co.

ST. PANCRAS. — Contracts and Libraries Committee. Recommended. Supply and erection of meter-testing battery (£78). — Chloride Electrical Storage Co. Spares for pulveriser mills (£202).—International Combustion, Ltd.

Warrington (Lancs.)—Electricity Committee. Accepted. Electric arc welding equipment (Type H.300).—Quasi-Arc Co. Two automatic dial recorders.—International Time Recording Co. Electrically-driven oil pump for turbo-alternator.—English Electric Co. One Hewittic rectifier equipment.—W. A. Boulting.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Altrincham.—Works canteen off Attenbury Lane ; W. Francis & Co., Ltd., Attenbury Lane, Park Road, Timperley.

Bedford.—Extensions at Bromham House Colony, Oakley ; County Architect's Department, Shirehall, Bedford.

Bolton.—Completion of bus station ; C. Herbert, borough engineer, Town Hall.

Brighton.—Additions and heating at hospital (£2,000) and sleeping accommodation at A.R.P. depots (£3,479) ; borough engineer.

Coventry.—School canteen at Coundon School (£1,450) ; D. E. E. Gibson, city architect, 1a, Warwick Row.

Croydon. — School kitchens (£1,700) ; Burnand & Pickett, Ltd.

Juvenile court ; borough engineer.

Cumberland.—Remand Home, Mill House, Brunstock ; J. H. Haughan, county architect, 4, Alfred Street North, Carlisle.

Darlington.—Day nursery schools at Harrowgate Hill and South Ward ; E. Minors, borough engineer, Town Hall.

Dorchester.—Extensions to Grammar School ; governors.

Dudley.—Extensions to nurses' home, Tipton Road ; A. T. Butler, hon. architect, 31, Priory Street.

Durham.—Cooking centre at Bishop Auckland ; F. Willey, 34, Old Elvet, Durham.

Glasgow.—Extensions to Notre Dame School ; education director.

Canteen, Dumbarton Road ; Yarrow & Co., Ltd.

Hastings. — Central kitchen, Silverhill ; borough engineer.

Hebburn-on-Tyne.—N.F.S. station, Harleyburn Road ; Divisional Officer, N.F.S., Westoe, South Shields.

Hertford.—Farm workers houses at Brayford, Bromfield and Walkern for R.D.C. ; Newland Bros., builders, 96, Strafford Gate, Potters Bar, Middlesex.

Jarrow-on-Tyne.—Proposed extension of Danesfield Maternity Hospital ; borough engineer.

London.—ISLINGTON.—Nursery, Tufnell Park Road (£3,634) ; C. & F. Bryen.

Manchester.—Works canteen, Rusholme ; Evac, Ltd., Rusholme, Manchester, 14.

Middlesex.—Kitchen and boiler house, Trinity School, Wood Green ; county architect.

North Riding.—Central kitchen for schools at Richmond ; D. Oakley, builder, Northallerton (in lieu of tender withdrawn).

Oldham.—Works canteen ; A. Turner & Son, architects, 11, Clegg Street.

Works canteen ; James Stott, Ltd., cotton spinners, Coldhurst Hall Mill, Magdala Street.

Radcliffe.—Alterations to mills ; Cross Lane Mills, Ltd.

Renfrew.—New office for Lobnitz & Co. ; manager.

Rochdale.—Extensions to mills ; Shawclough Mills (1920) Ltd.

Rushden.—British Restaurant for U.D.C. ; R. Marriott, builder, Higham Road.

Salford.—Factory extensions ; Carl Stone, waterproofs & mantles, 95/97, Broughton Lane, Lower Broughton, Salford, 7.

Shrewsbury.—Fire station, New Park Road (£2,365) ; A. W. Ward, borough surveyor, Guildhall.

Stourbridge.—Pumping station for Upper Stour Valley Main Drainage Board ; G. P. Deeley, engineer to the Board, Church Street.

Wallsend-on-Tyne.—Canteens at three schools ; J. A. Blench, borough engineer, Town Hall.

Warrington.—Works reconstruction after fire ; Winwick Tannery Co., Winwick Street.

Wellingborough.—Modernisation of pumping plant ; R. Kilbey, surveyor, Council Offices, Swanspool.

Worcestershire.—Buildings and boiler house for Council School, Longbridge ; Henry Rowe & Son, county architects, 38, Foregate Street, Worcester.